

Jefferson Lab Annual Standards and Specifications for Stormwater Management and Erosion & Sediment Control

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ACRONYMS / ABBREVIATIONS

BMP	Best Management Practice
DCR	Department of Conservation and Recreation
DEQ	Virginia Department of Environmental Quality
E&SC	Erosion & Sediment Control
ESD	Environmental Site Design
JSA	Jefferson Science Associates, LLC
LDA	Land Disturbing Activity
LID	Low Impact Development
MCM	Minimum Control Measures
MS4	Municipal Separate Storm Sewer Systems
PAE	Pacific Architects & Engineers
P2	Pollution Prevention
PR	Pollutant Removal
PY	Permit Year
RLD	Responsible Land Disturber
RR	Runoff Reduction
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TRO	Tidewater Regional Office
USDOE	United States Department of Energy
VAC	Virginia Administrative Code
VESCH	Virginia Erosion & Sediment Control Handbook
VESCLR	Virginia Erosion & Sediment Control Laws & Regulations
VPDES	Virginia Pollution Discharge Elimination System
VRRM	Virginia Runoff Reduction Method
VSMA	Virginia Stormwater Management Act
VSMP	Virginia Stormwater Management Program

EXECUTIVE SUMMARY

“Jefferson Lab, a forefront U.S. Department of Energy Nuclear Physics research facility, provides world-class, unique research capabilities and innovative technologies to serve an international scientific user community. Specifically, the laboratory’s mission is to:

- Deliver discovery-caliber research by exploring the atomic nucleus and its fundamental constituents, including precise tests of their interactions;*
- Apply advanced particle accelerator and detector technologies to address challenges of modern society;*
- Advance knowledge of science and technology through education and public outreach, and;*
- Provide responsible and effective stewardship of resources.”*

Jefferson Lab is managed and operated for the USDOE by Jefferson Science Associates, LLC (JSA). JSA is a limited liability corporation composed of the Southeastern Universities Research Association and Pacific Architects & Engineers (PAE) - Applied Technology Division, specifically to manage and operate Jefferson Lab.

Jefferson Lab is currently authorized to discharge under the Virginia Stormwater Management Program (VSMP) and the Virginia Stormwater Management Act (VSMA) through the *General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4)* under General Permit No. VAR040079.

Jefferson Lab does not currently have any land disturbances requiring an existing *General VPDES Permit for Discharges of Stormwater from Construction Activities*. However, these annual standards and specifications have been prepared in the effort to effectively manage a compliant stormwater management program for all applicable projects that will be executed onsite in the future.

1.0 Annual Standards and Specifications – Administration

- 1.1.** All land-disturbing activities regulated by the Virginia Stormwater Management Act (VSMA), the Virginia Stormwater Management Program (VSMP) Permit Regulations, the Virginia Erosion and Sediment Control (E&SC) Law, the Virginia E&SC Regulations and the Virginia Pollution Discharge Elimination System (VPDES) Program Permit Regulations shall adhere to the approved Jefferson Lab Annual Standards and Specifications for Stormwater Management (SWM) and E&SC as approved by the Virginia Department of Environmental Quality (DEQ).
- 1.2.** The approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC are composed of general specifications for land-disturbing activities and include, by reference, the following applicable laws, regulations, and technical guidance:
 - VSMA (§62.1-44. 15:24 et seq.), as amended;
 - VSMP Regulations (9VAC25-870 et seq.), as amended;
 - Virginia SWM Handbook, 1999, as amended;
 - Virginia E&SC Law (§62.1-44 et seq.), as amended;
 - Virginia E&SC Regulations (9VAC25-840 et seq.), as amended;
 - Virginia E&SC and SWM Certification Regulations (9VAC25-850 et seq.), as amended;
 - Virginia Erosion & Sediment Control Handbook (VESCH), 1992, as amended;
 - General VPDES Permit for Discharges of Stormwater from Construction Activities (9VAC25-880), as amended;
 - VPDES Program Permit Regulations (9VAC25-31), as amended;
 - Virginia Stormwater BMP Clearinghouse;
 - DCR's FAQ for Native vs. Invasive Plant Species for Erosion & Sediment Control,
<http://www.deq.virginia.gov/Portals/0/DEQ/Water/Publications/NativeInvasiveFAQ.pdf>.
- 1.3.** All land-disturbing activities occurring on Jefferson Lab property (including all associated offsite facilities such as borrow areas, materials storage area, and staging areas per 9VAC25-880-30.C and 9VAC25-840-80.D) shall meet the technical requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC in addition to the regulatory and technical requirements noted in Section 1.2. DEQ – Central Office requires electronic notification (e-notification) at least two weeks prior to initiating

a regulated land disturbance. The e-notification shall be sent to:
StandardsandSpecs@deq.virginia.gov. The notification must include:

- project name and any associated Construction General Permit #;
- project location (including nearest intersection, latitude and longitude);
- On-site project manager and contact information;
- Responsible Land Disturber (RLD) and contact information;
- Project description;
- Total acreage of land disturbance;
- Project start and finish dates (once the start date of a regulated land disturbance has been determined, the project manager must provide this information to the Jefferson Lab DEQ-Certified Program Administrator for official submittal to DEQ);
- Variances, waivers, or exemptions associated with the project.

SWM statutes and regulations define a “land disturbance” or “land disturbing activity” as a manmade change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except that the term shall not include those exemptions specified in § 62.1-44.15.34 of the Code of Virginia. E&SC statutes and regulations define a “land disturbing activity” (LDA) as any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into State waters or onto lands in the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting, and filling of land, except that the term shall not include:

- Minor land-disturbing activities such as home gardens and individual home landscaping, repairs, and maintenance work;
- Individual service connections;
- Installation, maintenance, or repair of any underground public utility lines when such activity occurs on an existing hard surfaced road, street, or sidewalk, provided that the land-disturbing activity is confined to the area of the road, street, or sidewalk that is hard surfaced;
- Septic tank lines or drainage fields unless included in an overall plan for land-disturbing activity relating to construction of the building to be served by the septic tank system;
- Permitted surface or deep mining operations and projects, or oil and gas operations and projects conducted pursuant to Title 45.1;
- Tilling, planting, or harvesting of agricultural, horticultural, or forest crops, livestock feedlot operations, or as additionally set forth by the Board in regulation, including engineering operations as follows: construction of terraces, terrace outlets, check dams, desilting basins,

dikes, ponds, ditches, strip cropping, lister furrowing, contour cultivating, contour furrowing, land drainage, and land irrigation; however, this exception shall not apply to harvesting of forest crops unless the area on which harvesting occurs is reforested artificially or naturally in accordance with the provisions of Chapter 11 (§ 10.1-1100 et seq.) of Title 10.1 or is converted to bona fide agricultural or improved pasture use as described in subsection B of § 10.1-1163;

- Repair or rebuilding of the tracks, rights-of-way, bridges, communication facilities, and other related structures and facilities of a railroad company;
- Agricultural engineering operations, including but not limited to the construction of terraces, terrace outlets, check dams, desilting basins, dikes, ponds not required to comply with the provisions of the Dam Safety Act (§ 10.1-604 et seq.), ditches, strip cropping, lister furrowing, contour cultivating, contour furrowing, land drainage, and land irrigation;
- Disturbed land areas of less than 10,000 square feet in size or 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations; however, the governing body of the program authority may reduce this exception to a smaller area of disturbed land or qualify the conditions under which this exception shall apply;
- Installation of fence and sign posts or telephone and electric poles and other kinds of posts or poles;
- Shoreline erosion control projects on tidal waters when all of the land-disturbing activities are within the regulatory authority of and approved by local wetlands boards, the Marine Resources Commission, or the United States Army Corps of Engineers; however, any associated land that is disturbed outside of this exempted area shall remain subject to this article and the regulations adopted pursuant thereto; and
- Emergency work to protect life, limb, or property, and emergency repairs; however, if the land-disturbing activity would have required an approved erosion and sediment control plan, if the activity were not an emergency, then the land area disturbed shall be shaped and stabilized in accordance with the requirements of the VESCP authority.

- 1.4.** Site-Specific Stormwater Pollution Prevention Plans (SWPPP) shall be prepared for all projects involving a regulated land-disturbing activity (equal to or greater than 1-acre) that requires a General VPDES Permit for Discharges of Stormwater from Construction Activities. All projects requiring a SWPPP must submit a site-specific SWPPP to the Jefferson Lab

DEQ-Certified SWM Plan Reviewer for review and approval, along with obtaining VAR10 Permit Authorization from DEQ prior to initiating any onsite land disturbing activities associated with the project.

1.5. Site-Specific E&SC Plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in the Virginia E&SC Regulations (10,000-square feet or more). Site-specific E&SC Plans shall be submitted to the Jefferson Lab DEQ-Certified E&SC Plan Reviewer for review and approval prior to initiating any onsite land disturbing activities associated with the project.

1.6. Records retention requirements are as follows:

- Project records shall be retained for at least three years following project completion or termination of State permit coverage;
- Annual Standards & Specifications holder shall maintain , either on-site or in files, a copy of the approved E&SC Plan and a record of inspections for each active land-disturbing activity;
- E&SC and SWM plans will be made available on-site;
- Documentation of stormwater management facility inspections shall be retained for at least five years from the date of inspection;
- Construction drawings shall be maintained in perpetuity or until a stormwater management facility is removed;
- Registration statements submitted to DEQ (including Application Submission Worksheet for State/Federal Construction Activities – See Appendix 8) shall be retained for at least three years following project completion or termination of State permit coverage.

2.0 Annual Standards and Specifications – Personnel

“An Annual Standards & Specifications holder may enter into agreements or contracts with soil and water conservation districts, adjacent localities, or other public or private entities to assist with carrying out the provisions of this article, including the determination of adequacy of erosion and sediment control plans submitted for land-disturbing activities on a unit or units of land as well for monitoring, reports, inspections, and enforcement where authorized in this article, of such land-disturbing activities (certifications of program administration cannot be contracted out and must be an employee of the Annual Standards and Specifications holder.”

Jefferson Lab’s DEQ-Certified personnel shall provide plan review for all applicable LDAs at Jefferson Lab and provide administration of the Jefferson Lab Annual Standards and Specifications for SWM and E&SC. The following is a summary of responsibilities and titles as related to the Jefferson Lab Annual Standards and Specifications for SWM and E&SC.

- 2.1 SWM and E&SC Program Administrator** shall have overall management and coordination responsibilities for the Jefferson Lab Annual Standards and Specifications for SWM and E&SC. This person(s) shall be certified by DEQ as a Combined Administrator.
- 2.2 SWM Plan Reviewers** shall be responsible for reviewing plans for compliance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC and applicable laws and regulations. The plan reviewer shall be certified by DEQ as a SWM Plan Reviewer.
- 2.3 E&SC Plan Reviewers** shall be responsible for reviewing plans for compliance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC and applicable laws and regulations. The plan reviewer shall be certified by DEQ as an Erosion & Sediment Control Plan Reviewer.
- 2.4 SWM and E&SC Inspectors** shall have the responsibility for inspecting stormwater management activities, SWPPP projects, Municipal Separate Storm Sewer Systems (MS4) practices and E&SC Plan projects to ensure compliance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC, along with all applicable laws and regulations. The assigned persons shall be certified by DEQ as an Inspector for SWM and E&SC. The Project Manager or site subcontractor shall also designate a qualified person to conduct ‘self-inspections’ of SWPPP and E&SC Plan

projects. Inspection reports shall be kept onsite and available to Jefferson Lab personnel during inspections.

2.5 Responsible Land Disturber (RLD), as assigned by the Project Manager or site subcontractor, shall hold a valid RLD Certificate as issued by DEQ and shall be accountable for assigned projects.

2.6 Certifications shall be in accordance with the Virginia E&SC and SWM Certificate Regulations.

3.0 Annual Standards and Specifications – Implementation

Jefferson Lab's DEQ-Certified personnel shall be responsible for the implementation of and compliance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC. Jefferson Lab's DEQ-Certified personnel shall conduct reviews and inspections of LDA's (including new construction, renovation and demolition projects) to ensure compliance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC, along with all applicable laws and regulations. Prior to commencement of a LDA, the project must have received written approval for the Plan from the Jefferson Lab DEQ-Certified Plan Reviewer and obtain coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities as applicable. Any land-disturbing activity to be considered qualified for 'grandfathering' must comply with the time limits of applicability and other requirements as described in 9VAC25-870-47 and 9VAC25-870-48.

3.1 Submittals

SWM and E&SC Plans, reports, certifications, and other record documents shall be submitted to Jefferson Lab's DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC.

3.2 Plan Reviews

Plan reviews shall be conducted by staff certified in accordance with the VSMP Regulations and Virginia E&SC Certification Regulations. Plan reviews shall ensure compliance with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. Jefferson Lab, as the Annual Standards and Specifications holder, retains the authority to approve E&SC and SWM plans. All E&SC and SWM plan reviews must be approved in writing. Jefferson Lab does not currently utilize a third party to fulfill the certification of plan reviewer and all plan approvals come from Jefferson Lab certified staff, with date of approvable plan noted in approval letter.

3.3 Inspections

Jefferson Lab's DEQ-Certified SWM and E&SC Inspector(s) are responsible for enforcing the project specific SWPPP and/or E&SC Plan and other environmental compliance requirements associated with the Pollution Prevention (P2) Plan portion. The site subcontractor shall also designate a competent person to conduct 'self-inspections' of SWPPP and E&SC Plan

projects. Inspection reports shall be kept onsite and available to the Jefferson Lab DEQ-Certified Inspector.

The RLD shall be in charge of and responsible for carrying out any regulated LDA's for applicable projects.

Jefferson Lab's DEQ-Certified SWM and E&SC inspector is responsible for coordination with the project manager, the onsite superintendent, and the project appointed Inspector to initiate scheduled inspections, onsite surveys and documentation of the SWM facility and/or stormwater conveyance channels ensuring the structures are constructed in accordance with the approved Plan.

Per the requirements of 9VAC25-840-60/§ 62.1-44.15.58, Periodic E&SC inspections are required for all applicable projects. **Jefferson Lab's DEQ-Certified E&SC Inspector shall:**

- Provide an inspection during or immediately following initial installation of erosion and sediment controls, at least once every two week period, within 48 hours following any runoff producing storm event, and at the completion of the project prior to the release of any performance bonds.
- E&SC measures utilized on a project site must adhere to the Standards & Specifications described in Chapter 3 of the VESCH; please reference E&SC Technical Bulletin #4 – Nutrient Management for Developmental Sites for recent updates to vegetative cover standards covered in VESCH Chapter 3 (Appendix 7).

"The use of VESCH, along with accompanying technical documents and guidance, control measures is strongly preferred. Non-VESCH control measures, best management practices (BMP), and specifications may be included in the Annual Standards and Specifications submission but their use may be further reviewed and approved by the applicable DEQ office on a project-specific basis. For all non-VESCH and proprietary control measures, please include all applicable practical information including definition, purpose, conditions where practice applies, planning considerations, design criteria, construction specifications, design tables and plates, and maintenance and inspections. Non-VESCH and proprietary control measures shall be installed per the manufacturer's instructions and with the intent of the VESCH specifications. Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized."

Per the requirements of 9VAC25-870-114/§ 62.1-44.15.37, Periodic SWM inspections are required for all applicable projects. **Jefferson Lab's DEQ Certified SWM Inspector:**

- Shall provide for periodic inspections of the installation of stormwater management controls;
- May require monitoring/reports from the personnel responsible for meeting permit compliance of permit conditions and to determine whether the required measure is providing effective stormwater management;
- Shall conduct investigations and perform actions necessary to carry out requirements of applicable laws & regulations described above.

Per the requirements of the Construction General Permit (CGP) for Discharges of Stormwater from Construction Activities, qualified personnel for the project (subcontractor, responsible land disturber, etc.) are required to conduct inspections at the following frequency:

- At least once every five business days, or;
- At least once every 10 business days and within 48 hours of a measurable storm event. In the event that a measurable event occurs when there are more than 48 hours between business days, the inspection shall be conducted no later than the next business day.

Per the requirements of the CGP, stormwater discharges to surface waters identified as impaired in the 2012 § 305(b)/303(d) Water Quality Assessment Integrated Report, for which a TMDL waste load allocation has been established, or to surface water identified as exceptional waters shall have SWPPP inspections conducted at the following frequency:

- (i) at least once every four business days, or;
- (ii) at least once every five business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted on the next business day; and;
- Representative inspections used by utility line installation, pipeline construction, or other similar linear construction activities shall inspect all outfalls discharging to surface waters identified as impaired or for which a TMDL waste load allocation has been established and approved prior to the term of the CGP.

Per the requirements of 9VAC25-870-114 A, The Annual Standards and Specifications holder shall inspect the land-disturbing activity during construction for:

- Compliance with the approved erosion and sediment control plan;
- Compliance with the approved stormwater management plan;
- Development, updating, and implementation of a pollution prevention plan; and
- Development and implementation of any additional control measures necessary to address a TMDL.

* SWPPPs are inspected at the start of construction and periodically throughout the project duration.

3.4 Revisions, Updates, or Amendments to Approved SWM and E&SC Plans

An approved SWM or E&SC Plan may be revised, updated or amended by the Jefferson Lab Project Manager in the following cases:

- Inspection reveals that the approved Plan is not in compliance with applicable regulations; or
- Changes in project planning or circumstances have altered the effectiveness of the approved Plan in maintaining compliance.

Any revisions, updates, or amendments to the approved Plan must be submitted in writing to the Jefferson Lab SWM and E&SC Program Administrator for review and approval. All redline items are checked/signed off by Jefferson Lab's DEQ Certified SWM/E&SC Inspector and if modifications require submittal to Jefferson Lab's DEQ Certified SWM/E&SC Plan Reviewer, they will be reviewed and reapproved. The amendments must comply with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. All approved changes must be immediately incorporated into project planning and performance to ensure compliance with applicable laws and regulations. DEQ must be notified of any changes to the project that affect information on the registration statement, permit fee form and/or permit coverage (information may be sent to: constructionGP@deq.virginia.gov).

Periodic SWM and E&SC Inspections shall ensure compliance with these Annual Standards and Specifications and the E&SC and SWM statutes and regulations. Inspection reports shall document onsite changes by noting issues of non-compliance. Corrective actions are identified on inspection reports and timeframe for completion.

3.5 Project Tracking of All LDAs and Notification to DEQ

DEQ – Central Office requires e-notification at least two weeks prior to initiating a regulated land disturbance. All E&SC and SWM land disturbing projects shall be submitted on an annual frequency. The e-notification shall be sent to: StandardsandSpecs@deq.virginia.gov. The notification must include:

- Project name and any associated Construction General Permit #;
- Project location (including nearest intersection, latitude and longitude);
- On-site project manager and contact information;
- Responsible Land Disturber (RLD) and contact information;
- Project description;
- Total acreage of land disturbance;
- Project start and finish dates (once the start date of a regulated land disturbance has been determined, the project manager must provide this information to the Jefferson Lab DEQ-Certified Program Administrator for official submittal to DEQ);
- Variances, waivers, or exemptions associated with the project.

4.0 Stormwater Pollution Prevention Plan Requirements

4.1 Submittals

SWPPPs shall be submitted to the Jefferson Lab DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. SWPPPs shall include: an approved **E&SC Plan**, an approved **SWM Plan**, and a **P2 Plan** for regulated land-disturbing activities. A SWPPP shall be developed, submitted to, and approved by the Jefferson Lab DEQ-Certified Plan Reviewer prior to submitting a registration statement to DEQ for permit coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities. The Jefferson Lab DEQ-Certified Plan Reviewer shall provide written notification that the submitted plan is complete within 10 working days of receiving the official submittal. Once the plan preparer has been notified that the plan is complete, the Plan Reviewer has 20 working days from the time of notification to complete the plan review. Final approval of a submitted plan must be provided to the plan preparer in a written notification.

4.1.1 E&SC Plan Section

Site specific E&SC Plans shall be prepared by the plan preparer per the requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. The E&SC Plan shall be submitted to Jefferson Lab DEQ-Certified Plan Reviewer for review and approval prior to initiating any land disturbing activities on the project site.

The Jefferson Lab DEQ-Certified Plan Reviewer shall review the E&SC Plan to ensure that it fulfills the requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC, and applicable laws and regulations. The person responsible for carrying out the plan shall certify that they will perform the E&SC measures described in the Plan. The person responsible for carrying out the plan shall identify the name of the individuals certified by DEQ as a RLD. All E&SC Plans shall include a statement describing the maintenance responsibilities required for ESC controls used.

An approved E&SC Plan prepared in accordance with the Jefferson Lab Annual Standards and Specifications for SWM and E&SC shall:

- Control the volume and velocity of stormwater runoff within the site to minimize erosion;

- Control stormwater discharges, including peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and bank erosion;
- Minimize the amount of soil exposed during the construction activity;
- Minimize the disturbance of steep slopes;
- Minimize sediment discharges from the site in a manner that addresses: the amount, frequency, intensity, and duration of precipitation; the nature of resulting stormwater runoff; and soil characteristics, including the range of soil particle size present on the site;
- Provides and maintains natural buffers around surface waters, directs stormwater to vegetated areas to increase sediment removal, and maximizes stormwater infiltration (if feasible);
- Minimize soil compaction and preserve topsoil;
- Ensure that stabilization of disturbed areas will be initiated immediately whenever any clearing, grading, excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 days;
- Utilize outlet structures that withdraw stormwater from the surface when discharging from sediment basins or sediment traps.

Please reference Section 6.0 for more detailed information on Erosion & Sediment Control Plan contents and preparation requirements.

4.1.2 Stormwater Management Plan Section

Site specific SWM Plans shall be prepared by the land disturber per the requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. The SWM Plan shall be submitted to the Jefferson Lab DEQ-Certified Plan Reviewer for review and approval prior to initiating any land disturbing activities on the project site (**See Appendix 1 for SWM Plan Review Checklist**).

The SWM Plan shall be prepared in compliance with the requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC, all applicable VSMP regulations and shall be developed in accordance with the following:

- Plan shall apply the SWM technical criteria set forth in this part to the entire land-disturbing activity;
- Plan shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff.

A complete SWM plan shall include:

- Information on the type of/location of stormwater discharge, information on the features to which stormwater is being discharged including surface waters, and predevelopment and post development drainage areas;
- Information including the project name, permit number, site designer, construction subcontractor, and location of the property affected;
- Narrative that describes current site conditions and final site conditions;
- A general description of the proposed stormwater management facilities, and the methods for operations and maintenance once construction is completed;
- Information on the proposed stormwater management facilities, that includes: type of facility, location (geographic coordinates), acres treated, and the surface waters into which the facility will discharge;
- Hydrologic and hydraulic computations, including runoff characteristics, time of concentration and associated flow paths, percent of impervious surfaces within each drainage area, runoff curve numbers, pollutants loads and load reduction requirements, and downstream analysis;
- Documentation and calculations verifying compliance with water quality/quantity requirements of VSMP regulations;
- Map that includes:
 - Vicinity;
 - Site topography;
 - Contributing drainage areas;
 - Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;
 - Soil types, geologic formations, forest cover, and other vegetative areas;
 - Current land use including existing structures, roads, and locations of known utilities and easements;

- Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
- The limits of clearing and grading, and the proposed drainage patterns on the site;
- Proposed buildings, roads, parking areas, utilities, and stormwater management facilities;
- Proposed land use with calculation of the percentage of surface area to be adapted to various uses (planned locations of utilities, roads, easements);
- Representative cross-sectional and profile drawings and details of stormwater measures and conveyances;
- Final stabilization and landscaping plans.

4.1.3 P2 Plan Section

A P2 Plan addresses potential pollutant-generating activities that may affect the quality of stormwater discharges from construction activities. The P2 Plan shall:

- Identify potential pollutant-generating activities and pollutants expected to be exposed to stormwater;
- Describe the location where the potential pollutant-generating activities will occur;
- Identify all authorized non-stormwater discharges that will be commingled with stormwater discharges from the construction activities;
- Identify the person responsible for implementing the P2 practices for each pollutant-generating activity;
- Describe the practices and procedures implemented to:
 - Prevent, respond to, and report spills, leaks, and other releases, including stopping, containing, and cleaning up the release;
 - Prevent the discharge of spilled and leaked fuels and chemicals from fueling and maintenance operations;
 - Prevent the discharge of soaps, solvents, detergents, and wash water from construction materials;
 - Prevent the discharge of pollutants from equipment wash down;
 - Direct concrete wash water into leak proof containers or settling basins; container or basin shall be designed to prevent overflows; hardened concrete washout materials and other waste shall be removed and disposed of in a manner consistent with handling other

- construction waste; liquid concrete wastes shall be removed and disposed of in a manner consistent with handling of other construction waste waters and shall not be discharged to the surface or sanitary sewer;
- Prevent the discharge of pollutants from storage, handling, and disposal of construction products, materials, and waste including: asphalt sealants, copper flashing, roofing materials, grout, adhesives, and concrete mixtures, pesticides, herbicides, insecticides, fertilizers and landscape materials, packaging materials, masonry products, timber, pipe and electrical cuttings, plastics, Styrofoam, and other trash;
- Prevent the discharge of fuels, oils, and other petroleum products, hazardous and toxic wastes, and sanitary wastes;
- Describe procedures for providing P2 awareness of all applicable wastes, including wash water, disposal practices, and waste disposal locations to onsite personnel in order to comply with the conditions of the SWPPP and general permit

5.0 Environmental Site Design (ESD) and Low Impact Development (LID) Practices

The concept of ESD was created with the objective of maintaining balance with the environment as new developments occur within our watersheds, as long as a few basic principles are obeyed. ESD requires an understanding of our natural systems and the commitment to work within these systems whenever and wherever possible. ESD views stormwater as a resource to be managed rather than a waste product in need of disposal. The goal of ESD is to promote stormwater runoff control through the use of natural drainage systems to reduce the environmental impact of common land development practices and drainage methods.

In addition to maintaining natural drainage, ESD shall:

- Provide a natural open-space based drainage system using undeveloped flood plains and drainage swales;
- Avoid channelization within the natural drainage system;
- Maintain forest cover and other natural vegetation to the extent feasible.

ESD utilizes small-scale stormwater management practices, non-structural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources. These include:

- Conservation of existing natural features (e.g., drainage patterns, soils, vegetation);
- Minimizing impervious surfaces;
- Slowing down runoff to maintain discharge timing and to increase infiltration and evapotranspiration on the development;
- Using other non-structural practices or innovative technologies approved by DEQ.

ESD can help developers and local government recognize increased economic and environmental benefits through reduced infrastructure requirements, decreased need for clearing and grading of sites, and less expenditure to meet stormwater management requirements due to reduced runoff volumes and pollutant export from sites.

ESD incorporates the 8 following principles into the design process:

- Achieve multiple objectives;

- Integrate stormwater management and design early in the site planning and design process;
- Prevent problems to avoid having to mitigate them;
- Conserve resources and minimize land cover changes;
- Design the development to fit the terrain;
- Apply decisions that have the effect of maintaining the natural site hydrology;
- Manage stormwater as close to the point of origin as possible to minimize collection and conveyance;
- Rely to the maximum on natural processes that occur within the soil and plant community.

Per 9VAC25-870-63 of the new VSMP regulations, the total phosphorus load of new development projects shall not exceed 0.41 pounds per acre per year, as calculated using the Virginia Runoff Reduction Method (VRRM). Compliance with the site based load limit of 0.41 lbs/acre/year can be achieved through multiple design strategies (individually or combined). The site designer can decide how to proceed by identifying the layout and the overall footprint of the development in terms of disturbed areas, grading, and permanent infrastructure improvements such as buildings, houses, roads, parking lots, etc.

The VRRM compliance spreadsheet is designed to help designers and plan reviewers quickly evaluate the implementation of stormwater practices on a given site and verify compliance with the regulations (Reference Guidance Memo No. 16-2001 – Updated Virginia Runoff Reduction Method Compliance Spreadsheets – Version 3.0: http://www.deq.virginia.gov/Portals/0/DEQ/Water/StormwaterManagement/VRRM/GM14-2001%20Virginia%20Runoff%20Reduction%20Method_V3.pdf).

The VRRM was developed in order:

- to promote better stormwater design;
- to provide incentives for the use of LID and ESD strategies in the design of land development projects, and;
- to provide credit for the conventional stormwater practices that achieve pollutant removal.

LID and ESD are similar if not identical terms that describe the land development process as being focused on preserving the hydrologic function of the land by identifying existing natural features such as permeable soils, steep slopes, mature vegetation, streams and wetlands, etc., at the outset of a project, i.e., before the layout and design of the basic development pattern and infrastructure. The VRRM allows the designer to take credit for preserving those features, as well as other strategies such as reducing the amount of land disturbed during construction,

reducing the impervious cover, etc., which serves to reduce the overall stormwater impact of the project and provide a pathway for compliance with the Virginia Stormwater Management Regulations.

The VRRM also provides credit for the total performance of structural and non-structural stormwater management practices. The total performance, or Total Mass Load Removal defined with the Virginia BMP Clearinghouse specifications, is a function of the practice's ability to achieve runoff reduction (RR) and pollutant removal (PR).

The VRRM incorporates the three features mentioned above into a step-wise procedure that is captured in the VRRM Compliance Spreadsheets (See Appendix 5) and is described as follows:

- Apply site design practices to minimize disturbance of soils, impervious cover, grading, and loss of forest or other mature vegetative cover – This step focuses on implementing ESD practices during the early phases of site layout. This process reduces the amount of rainfall that becomes runoff, thereby reducing the volume of runoff that must be managed and treated, and the corresponding required land pollutant load reduction;
- Apply RR practices – In this step, the designer selects the most appropriate RR practices or combination of RR practices for the site. The designer estimates the drainage area to be managed by each practice and the spreadsheet reduces the runoff volume based on the particular RR practice performance credit. The designer can use RR practices in series within individual drainage areas, e.g., a rooftop disconnection draining to a grass channel which in turn drains to a bio-retention basin, in order to incrementally reduce the runoff volume further with each practice;
- Apply PR practices – In this step, the designer applies PR practices to address any additional load reduction requirement needed in order to meet the water quality requirements;
- Determine if the strategy has met the required Site Based Pollutant Load Limit of the regulations – The VRRM Compliance Spreadsheet is a very convenient tool for quickly verifying the performance of the design and management practices, and fosters an iterative process to determine the most effective site design and stormwater practice strategy for the project.

The documentation for all of the elements of the VRRM is found in the Technical Memorandum: The Runoff Reduction Method – April 18, 2008 (See Appendix 6).

6.0 Erosion and Sediment Control Plan Requirements

6.1 Submittals

E&SC Plans shall be submitted to the Jefferson Lab DEQ-Certified Plan Reviewer for review and approval. All submittals shall be in accordance with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. The E&SC Plan shall describe the potential for erosion and sedimentation during a land-disturbing activity. The plan shall contain sufficient information to demonstrate that erosion and sedimentation problems have been adequately addressed for the proposed project. The length and complexity of the E&SC Plan shall be commensurate with the project size, site conditions, and potential for offsite/downstream damage. Each E&SC Plan shall have a written portion known as the narrative and an illustrative portion known as a plan. The Jefferson Lab DEQ-Certified Plan Reviewer shall provide review and approval or denial within 15 days of receiving the official submittal.

The primary guidelines for determining the adequacy of an E&SC Plan are the Virginia Erosion and Sediment Control Regulations and the VESCH. Each of the *Minimum Standards* in Section 40 of the Regulations shall be satisfied in the E&SC Plan, unless a special variance is granted (Please see Section 8 for more information on variances, exceptions, and non-regulated activities). Chapter 3 of the VESCH contains minimum standards and specifications for E&SC practices. These standards and specifications shall be adhered to during the design, installation, inspection, and maintenance of each control utilized.

6.2 Step-By-Step Procedure for Preparing the E&SC Plan

Data collection shall include:

- **Topography** – a small scale topographic map of the project site shall be prepared to show the existing contour elevations at consistent intervals that accurately depicts site conditions;
- **Drainage Patterns** – all existing drainage patterns and swales on the project site should be located and marked on the topographic map;
- **Soils** – major soil types on the project site shall be identified on the topographic map;
- **Ground Cover** – existing vegetation such as trees, grass covered areas, and denuded areas shall be shown on the topographic map;

- **Adjacent Areas** – areas adjacent to the project site shall be identified on the topographic map.

6.3 Data Analysis

After the Data Collection is completed, the project planner will be able to better identify potentially critical erosion issues on the project site. The following information shall be considered during the Data Analysis:

6.3.1 Topography

The primary topographic issues to be considered are slope steepness and slope length. Because of the effect of accumulated runoff, erosion potential is greater on long, steep slopes. When the percent of a slope is determined, areas with similar steepness shall be outlined. Slope gradient can be grouped into three general ranges of soil erodibility:

- 0-7% slopes – low erosion potential;
- 7-15% slopes – moderate erosion potential;
- >15% slopes – high erosion potential.

Within these slope gradients, the erosion potential becomes greater as the slope length increases. Therefore, in determining potentially critical erosion areas, the project planner shall be aware of excessively long slopes. The potential erosion issue will become critical if the slope exceeds the following criteria:

- 0-7% slopes – 300 feet;
- 7-15% slopes – 150 feet;
- >15% slopes – 75 feet.

6.3.2 Drainage Patterns

The existing drainage patterns on the project site, which consists of overland flow, swales, and depressions, and natural water courses, shall be identified in order to plan around critical areas where water will concentrate. Wherever possible, natural drainage ways should be used to convey stormwater runoff over and off the project site in order to avoid the expensive and problematic issues with constructing an artificial drainage system. Man-made ditches and conveyances can become part of the erosion problem if they are not properly designed and constructed.

6.3.3 Soils

Soils properties such as natural drainage, depth to bedrock, depth to seasonal water table, permeability, shrink-swell potential, texture, and erodibility should strongly influence land development decisions for a project.

6.3.4 Ground Cover

Ground cover is the most important factor in preventing erosion on a project site. Any existing vegetation that can be saved will be done to prevent erosion. Staging of construction shall be considered during project planning. Staging of construction involves the stabilization of one portion of the site prior to disturbing another portion.

Temporary seeding, mulching, and/or stabilization matting of exposed areas can limit the time of exposure and reduce potential erosion issues for a project site.

6.3.5 Adjacent Areas

The analysis of adjacent areas shall focus on areas located downslope of the project site. Special attention shall be focused on downstream water courses that will receive direct runoff from the project site. The potential for sedimentation and downstream erosion shall be considered due to increase volume, velocity and peak flow rate of stormwater runoff from the project site (Please reference Minimum Standard 19 for further information).

6.4 Site Plan Development

After analyzing the data and determining the site dynamics, the project planner can develop a site plan (**See Appendix 2 for E&SC Plan Review Checklist**). The following shall be considered when developing the site plan:

- **Fit development within terrain** – development of a project area shall be designed to work with the existing site conditions to avoid unnecessary land disturbance, erosion issues and costs. Slopes shall be designed to maximum of 2:1 to provide for final stabilization;
- **Avoid land disturbances in critical erosion areas on the project site** – land disturbances in critical erosion areas will require the installation of more costly control measures;
- **Cluster buildings together** – cluster buildings to minimize the total disturbed area, concentrate utility connection locations, provide more open space, lessen erodible areas, reduce runoff, and reduce development costs;

- **Minimize impervious areas** – minimize impervious surfaces such as parking lots and roads;
- **Utilize the natural drainage patterns onsite** – preserving the natural drainage system of a site can reduce the potential for downstream damage due to the installation of storm sewers or concrete channels;
- **Calculate runoff** – runoff calculations shall be done to determine the effect of the proposed development on the hydrologic system. Refer to Chapters 4 and 5 of VESCH for more information on the VESCR and calculation procedures. After the calculations have been completed, make the necessary changes to achieve compliance with runoff requirements.

6.5 Plan for Erosion and Sediment Controls

Once the site layout has been designed, a plan must be developed for controlling erosion and sedimentation from disturbed areas. The 19 E&SC **Minimum Standards** located at 9VAC25-840-40 should serve as a guide for determining the level of controls applicable for any project.

The following process shall be utilized for erosion and sediment control planning:

- **Determine the limits of clearing and grading** – decide which areas will be disturbed, particularly critical areas, in order to accommodate the proposed land disturbance;
- **Divide the site into drainage areas** – determine how stormwater runoff will travel across the developed project site; consider how erosion and sedimentation will be controlled in each drainage area prior to considering the entire project site;
- **Select the applicable erosion and sediment control practices** – erosion and sediment control practices can be divided into 3 subcategories: vegetative controls, structural controls, and BMPs. Vegetative and structural controls shall be selected and designed per the requirements of Chapter 3 of the VESCH. BMPs include construction management practices that can minimize the need for physical controls and reduce costs, if properly utilized:
 - **Vegetative controls** – preventing erosion shall be the top priority in preparing an E&SC Plan; this is accomplished by protecting the soil surface from raindrop impacts and overland flow of runoff. The most effective method for protecting the soil surface is to preserve the existing ground cover;

Temporary seeding or mulching shall be utilized on the project site and staging of construction activities shall be conducted in order to minimize the amount of disturbed areas on a construction site at any one time. E&SC Plans shall contain requirements for permanent stabilization of denuded areas and the selection of permanent vegetation shall include the following considerations: applicability to site conditions, establishment requirements, maintenance requirements, aesthetics;

- **Structural controls** – often used as a second or third line of defense for capturing sediment before it leaves the project site; generally more costly than vegetative measures but usually necessary since not all disturbed areas can be protected with vegetative controls. Structural controls shall be selected, designed and installed per the requirements of the standards and specifications in Chapter 3 of the VESCH;
- **Best management practices (BMPs)** – good construction management practices can be as important as both vegetative and structural controls, with little to no costs involved. The following are examples of good construction BMPs for E&SC:
 - Include E&SC as an agenda item for the preconstruction meeting;
 - Stage or sequence construction to minimize the amount of time that areas remain un-stabilized (work in a logical sequence across the project site, utilize temporary seeding immediately after grading, etc.);
 - Consider the time of year or seasons that the work will be conducted (success of vegetative practices, amounts of rainfall, the growing season, etc.);
 - Physically mark off the limits of land disturbance on the project site with tape, signs or other methods, so workers can clearly see the areas to be protected;
 - Develop and carry out a regular maintenance schedule for E&SC practices;
 - Designate one individual responsible for implementing the E&SC Plan on the project site.
- **Plan for stormwater management** – the site planner shall select appropriate stormwater management measures in order to satisfy the requirements of *Minimum Standard 19*.

6.6 Prepare the E&SC Plan

Once the planning work described in Sections 6.2 through 6.5 has been completed, it is time to consolidate the information into a project specific E&SC Plan. The E&SC Plan consists of two parts: the narrative and the site plan. The narrative explains the problems and solutions in writing, with all of the necessary supporting documentation. The site plan is the plan or drawing set that depicts the information contained within the narrative. Table 6-1 of the VESCH contains General Erosion and Sediment Control Notes (**See Appendix 4 for General E&SC Notes**) is to be used as a guide during Plan development and shall be included as an attachment to the completed plan to be utilized by the site developer. The E&SC Plan Checklist shall be used a guide by the site planner during E&SC Plan development and also by the plan reviewer to determine if all of the required elements of the Plan have been covered. The E&SC Checklist shall also be included as an attachment to the completed plan.

7.0 Inspection and Maintenance Requirements

7.1 SWPPP Inspection Personnel

Inspections required by the permit and project specific SWPPP shall be conducted by a qualified person that is a DEQ-Certified SWM Inspector. Inspections will be conducted by a competent person identified by the project manager. Jefferson Lab's DEQ-Certified SWM Inspector shall also conduct inspections to ensure compliance with the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC.

7.2 SWPPP Inspection Schedule

Inspections shall be conducted at the following frequency:

- At least once every four business days; or
- At least once every five business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted on the next business day.

7.3 SWPPP Inspection Requirements

The Jefferson Lab DEQ-Certified SWM Inspector and project manager designated DEQ-Certified SWM Inspector shall inspect the land-disturbing activity during construction for: compliance with the approved E&SC Plan; compliance with the approved SWM Plan; development, update, and implementation of a P2 Plan; and development and implementation of any additional control measures necessary to address a TMDL; ensure that stormwater management facilities are being adequately maintained as designed after completion of the land-disturbing activities (**See Appendix 3 for SWPPP/E&SC Inspection Report form**); as part of the inspection, the qualified personnel shall:

- Record the date/time of inspection and the date and rainfall amount of the most recent measurable storm event;
- Record the information and description of any discharges occurring at the time of the inspection;
- Record any land disturbing activities that have occurred outside of the approved Plan;
- Inspect the following for installation in accordance with the approved Plan, identification of any maintenance needs, and evaluation of effectiveness in minimizing sediment discharge, including the whether the control has been inappropriately or incorrectly used:

- Perimeter erosion and sediment controls, such as silt fence;
 - Soil stockpiles and borrow areas for stabilization or sediment trapping measures;
 - Completed earthen structures, such as dams, dikes, ditches, and diversions for stabilization;
 - Cut and fill slopes;
 - Sediment basins and traps, sediment barriers, and other measures installed to control sediment discharge from stormwater;
 - Temporary or permanent channel, flume, or other slope drain structures installed to convey concentrated runoff down cut and fill slopes;
 - Storm inlets that have been made operational to ensure that sediment laden stormwater does not enter without first being filtered or similarly treated;
 - Construction vehicle access routes that intersect or access paved roads for minimizing sediment tracking.
- Inspect areas that have reached final grade or that will remain dormant for more than 14 days for initiation of stabilization activities;
- Inspect areas that have reached final grade or that will remain dormant for more than 14 days for completion of stabilization activities within seven days of reaching grade or stopping work;
- Inspect for evidence that the approved erosion and sediment control plan prepared in accordance with approved annual standards and specifications has not been properly implemented; this includes but is not limited to:
 - Concentrated flows of stormwater in conveyances that have not been filtered, settled, or similarly treated prior to discharge;
 - Sediment laden or turbid flows of stormwater that have not been filtered or settled to remove sediments prior to discharge;
 - Sediment deposition in areas that drain to unprotected stormwater inlets or catch basins that discharge to surface waters (inlets and catch basins with failing sediment controls due to improper installation, lack of maintenance, or inadequate design are considered unprotected);
 - Sediment deposition on any property (including public and private streets) outside of the project are covered by the general permit;

- Required stabilization has not been initiated or completed on portion of the project site;
 - Sediment basins without adequate wet or dry storage volume or sediment basins that allow the discharge of stormwater from below the surface of the wet storage portion of the basin;
 - Sediment traps without adequate wet or dry storage or sediment traps that allow the discharge of stormwater from below the surface of the wet storage portion of the sediment trap;
 - Land disturbance outside of the authorized area to be disturbed.
- Inspect pollution generating activities identified in the P2 Plan for proper implementation, maintenance, and effectiveness of the procedures and practices;
 - Identify any pollutant generating activities not identified in the P2 Plan;
 - Identify and document the presence of any evidence of the discharge of pollutants prohibited by the general permit, the SWM Plan, and applicable regulations;

7.4 SWPPP Inspection Reports

Each inspection report shall include the following:

- Date/time of the inspection, and the date and rainfall amount of the most recent measurable storm event;
- Summary of the inspection findings;
- Location(s) of prohibited discharges;
- Location(s) of control measures that require maintenance;
- Location(s) of control measures that failed to operate as designed or proved inadequate or inappropriate for a particular location;
- Location(s) where any evidence identified of the SWPPP not being implemented as approved per the Jefferson Lab Annual Standards and Specifications for SWM and E&SC and applicable regulations;
- Location(s) where any additional control measure is needed that did not exist at the time of inspection;
- List of corrective actions required as a result of the inspection or to maintain permit compliance;
- Documentation of any corrective action required from previous inspections that has not been implemented;
- Date and signature of the qualified personnel conducting the inspection; and

- Corrective actions identified as a result of an inspection shall be implemented as soon as practicable but no later than seven days after being observed or a longer period as approved by the Jefferson Lab DEQ-Certified Inspector.

7.5 E&SC Inspection Personnel

Inspections required by the project specific E&SC Plan shall be conducted by the Jefferson Lab DEQ-Certified E&SC Inspector and project manager designated DEQ-Certified E&SC Inspector.

7.6 E&SC Inspection Schedule

Periodic inspections are required on all projects; the inspection schedule shall either:

7.6.1 Conduct periodic inspections:

- During or immediately following the initial installation of erosion and sediment controls;
- At least once in every two-week period;
- Within 48-hours following any runoff producing storm event;
- At the completion of the project.

7.6.2 Document inspections observations and findings

In written report or inspection log; reports shall contain:

- Date and time of inspection;
- Comments concerning compliance or non-compliance;
- Notes on any coordination with project manager, site superintendent, responsible land disturber, regulatory agencies as related to the project;
- Description of current stages of construction, stabilization requirements and any major changes planned prior to next scheduled inspection;
- Signature of qualified person conducting inspection and date of inspection.

7.7 E&SC Inspection Requirements

As part of the inspection, the qualified personnel shall:

- Record the date/time of inspection and the date and rainfall amount of the most recent measurable storm event;
- Record the information and description of any discharges occurring at the time of the inspection;

- Record any land disturbing activities that have occurred outside of the approved E&SC Plan;
- Inspect the following for installation in accordance with the approved E&SC Plan, identification of any maintenance needs, and evaluation of effectiveness in minimizing sediment discharge, including whether the control has been inappropriately or incorrectly used:
 - Perimeter erosion and sediment controls, such as silt fence;
 - Soil stockpiles and borrow areas for stabilization or sediment trapping measures;
 - Completed earthen structures, such as dams, dikes, ditches, and diversions for stabilization;
 - Cut and fill slopes;
 - Sediment basins and traps, sediment barriers, and other measures installed to control sediment discharge from stormwater;
 - Temporary or permanent channel, flume, or other slope drain structures installed to convey concentrated runoff down cut and fill slopes;
 - Storm inlets that have been made operational to ensure that sediment laden stormwater does not enter without first being filtered or similarly treated;
 - Construction vehicle access routes that intersect or access paved roads for minimizing sediment tracking;
 - Inspect areas that have reached final grade or that will remain dormant for more than 14 days for initiation of stabilization activities;
 - Inspect areas that have reached final grade or that will remain dormant for more than 14 days for completion of stabilization activities within seven days of reaching grade or stopping work;
 - Inspect for evidence that the approved E&SC Plan prepared in accordance with approved annual standards and specifications has not been properly implemented; this includes but is not limited to:
 - Concentrated flows of stormwater in conveyances that have not been filtered, settled, or similarly treated prior to discharge;
 - Sediment laden or turbid flows of stormwater that have not been filtered or settled to remove sediments prior to discharge;
 - Sediment deposition in areas that drain to unprotected stormwater inlets or catch basins that discharge to surface

- waters (inlets and catch basins with failing sediment controls due to improper installation, lack of maintenance, or inadequate design are considered unprotected);
- Sediment deposition on any property (including public and private streets) outside of the project are covered by the general permit;
 - Required stabilization has not been initiated or completed on portion of the project site;
 - Sediment basins without adequate wet or dry storage volume or sediment basins that allow the discharge of stormwater from below the surface of the wet storage portion of the basin;
 - Sediment traps without adequate wet or dry storage or sediment traps that allow the discharge of stormwater from below the surface of the wet storage portion of the sediment trap;
 - Land disturbance outside of the authorized area to be disturbed;
 - Ensure that all E&SC measures are designed, installed, and functioning as required in Chapter 3 of the VESCH;
 - Utilize the **19 Minimum Standards** as a checklist guide while conducting inspections.

7.8 Maintenance Requirements

Section 9 VAC 25-870-112 of the VSMP regulations require the provision of long-term maintenance responsibilities of SWM facilities and other techniques specified to manage the quality and quantity of runoff. Such requirements shall be set forth prior to State permit termination or earlier as required by the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC and applicable regulations. At a minimum, the provisions shall:

- Be submitted to the Jefferson Lab DEQ-Certified Program Administrator for review and approval prior to the approval of the SWM Plan;
- Be stated to run with the land;
- Provide for all necessary access to the property for purposes of maintenance and regulatory inspections;
- Provide for inspections and maintenance and the submission of inspection and maintenance reports to the Jefferson Lab DEQ-Certified SWM Inspector;
- Be enforceable by all appropriate governmental parties.

8.0 Variances, Exceptions, Prohibited Stormwater Discharges And Authorized Non-Stormwater Discharges

8.1 Requests for Variances and Exceptions

Variances and exceptions must ensure protection of offsite properties, and maintain compliance with existing regulations, along with the requirements of the approved Jefferson Lab Annual Standards and Specifications for SWM and E&SC. A written variance request must be submitted to the DEQ TRO for review and approval. The request shall include reasoning for the requested variance and a description of the site specific conditions that require variance or exception. The request shall also include a description of the alternative SWM or E&SC practice to be utilized and justifications that the alternative practice complies with all applicable regulations. It is strongly recommended that all requests for variances and exceptions be submitted as early as possible in the project planning process in order to accommodate project scheduling.

A variance may be granted under the following conditions:

- At the time of plan submission, an applicant may request a variance to become part of an approved SWM or E&SC Plan. Variances that are approved by DEQ TRO must be documented in the approved plan;
- During construction, the person responsible for implementing the approved plan may request a variance;
- The Jefferson Lab DEQ-Certified Program Administrator will consider variance requests judiciously by considering the need of the applicant and the need to protect off-site properties and resources from damage. All variance requests received by the Jefferson Lab DEQ-Certified Program Administrator will be forwarded to DEQ TRO for review and approval.

8.2 Prohibited Stormwater Discharges

Except as provided in section C below, all discharges covered by the General VPDES Permit for Discharges of Stormwater from Construction Activities shall be composed entirely of stormwater associated with construction activities; all other discharges, including the following, are prohibited:

- Wastewater from washout of concrete or grout;
- Wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;

- Oils, toxic substances, or hazardous substances from spills or other releases;
- Soaps, solvents, or detergents;
- Post-construction discharges.

8.3 Authorized Non-Stormwater Discharges

The following non-stormwater discharges from construction activities are authorized by the General VPDES Permit for Discharges of Stormwater from Construction Activities:

- Discharges from firefighting activities;
- Fire hydrant flushing;
- Water used to control dust that has been filtered, settled, or similarly treated prior to discharge;
- Uncontaminated potable water sources, including uncontaminated water line flushing;
- Routine external building wash down where soaps, solvents, or detergents have not been used and the wash water has been filtered, settled, or similarly treated prior to discharge;
- Pavement wash water where spills or leaks of toxic or hazardous materials have not occurred; where soaps, solvents or detergents have not been used; and where the wash water has been filtered, settled, or similarly treated prior to discharge;
- Uncontaminated air conditioning or compressor condensate;
- Uncontaminated groundwater or spring water;
- Foundation or footing drains where flows are not contaminated with process materials such as solvents;
- Uncontaminated excavation dewatering, including dewatering of trenches and excavations that have been filtered, settled, or similarly treated prior to discharge;
- Landscape irrigation.

9.0 DEQ Oversight Responsibilities

9.1 Enforcement

- Enforcement shall be administered by DEQ and the Board where applicable, for 62.1-44.15.27.F, *"The Board may approve a State entity, including the Department, federal entity, or, for linear projects subject to annual standards and specifications, electric, natural gas, and telephone utility companies, interstate and intrastate natural gas pipeline companies, railroad companies, or authorities create pursuant to 15.2-5102 to operate a Virginia Stormwater Management Program consistent with the requirements of this article and its associated regulations and the VSMP authority's Department-approved annual standards and specifications. For these programs, enforcement shall be administered by the Department and the Board where applicable in accordance with the provisions of this article."*;
- The Department and the Board, where applicable, shall provide project oversight and enforcement as necessary and comprehensive program compliance review and evaluation. The Department may take enforcement actions in accordance with this article and related regulations for 62.1-44.15.54.E/62.1-44.15.56.G, *"The Board may approve a State entity, federal entity, or, for linear projects subject to annual standards and specifications, electric, natural gas, and telephone utility companies, interstate and intrastate natural gas pipeline companies, railroad companies, or authorities created pursuant to 15.2-5102 to operate a VESCP consistent with the requirements of this article and its associated regulations and the VESCP authority's Department-approved annual standards and specifications. For these programs, enforcement shall be administered by the Department and the Board where applicable in accordance with the provisions of this article./If the State agency or federal entity has developed, and the Department has approved, annual standards and specifications, and the State agency or federal entity has been approved by the Board to operate a VESCP as a VESCP authority, erosion and sediment control plan review and approval and land-disturbing activity inspections shall be conducted by such entity. The Department and the Board, where applicable, shall provide project oversight and enforcement as necessary and comprehensive program compliance review and evaluation. Such standards and specifications shall be consistent with the requirements of this article and associated regulations and the Stormwater Management Act and associated regulations when applicable"*.

9.2 Complaints and Inspections

- The Department shall perform random site inspections or inspections in response to a complaint to assure compliance with 62.1-44.15.31.C and associated regulations.

9.3 Fees

- The Department shall assess an administrative charge to cover the costs of services rendered associated with its responsibilities pursuant to 62.1-44.15:31.D;
- The Board shall have the authority to enforce approved specifications and charge fees equal to the lower of (pursuant to 62.1-44.15.55.D):
 - (i) \$1,000 or
 - (ii) An amount sufficient to cover the costs associated with standard and specification review and approval, project inspections, and compliance.

9.4 DEQ Discretionary Requirements

- Inspection reports conducted by Jefferson Lab, as well as complaint logs and complaint responses may be required to be submitted to DEQ;
- Jefferson Lab may be required to provide weekly e-reporting to the department's applicable regional office:
 - (i) Inspection reports;
 - (ii) Pictures;
 - (iii) Complaint logs and complaint responses; and
 - (iv) Other compliance documents.

APPENDIX 1 – STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST

JEFFERSON LAB STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST

A. General Information:

Date of Plan Submittal: _____ Notification Due Date: _____

Project Name: _____

Permit Number: _____

Site Designer: _____

Construction Subcontractor: _____

Plan Status:

☐ Complete

☐ Incomplete

B. Technical Review:

***SWM Plans shall apply the stormwater management technical criteria set forth in the VSMP regulations to the entire land-disturbing activity and shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff. Some of the items on this checklist may not apply to a particular project and it is therefore up to the site designer or plan reviewer to indicate which items are not applicable. A complete SWM Plan shall include the following elements:**

☐ Information on type of and location of stormwater discharges

☐ Information on the features to which stormwater is being discharged

☐ Pre-development and post-development drainage areas

☐ A narrative that includes a description of current site conditions and final site conditions

☐ A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete including: (i) the type of facilities; (ii) location, including geographic coordinates; and (iii) acres treated

☐ **Mapping and Plans that include:**

- (i) Vicinity**
- (ii) Topographic features**
- (iii) Legend and North Arrow**
- (iv) All contributing drainage areas**
- (v) Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains**
- (vi) Soil types, forest cover, and other vegetative areas**
- (vii) Current land use including existing structures, roads, impervious areas, and locations of known utilities and easements**
- (viii) Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels**
- (ix) The limits of clearing and grading, areas to be protected from disturbance, and the proposed drainage patterns on the site**
- (x) Existing and proposed buildings, roads, parking areas, utilities, and stormwater management facilities**
- (xi) Existing and proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements**
- (xii) Selection, location, and design of both structural and non-structural stormwater control measures**
- (xiii) Final stabilization and landscaping plans**

***A construction record drawing for permanent stormwater management facilities shall be provided to the Jefferson Lab SWM and E&SC Program Authority. All new permanent stormwater management facilities will be incorporated into Jefferson Lab's GIS Map for Municipal Separate Storm Sewer Systems (MS4) and will become a part of the Jefferson Lab MS4 stormwater conveyance system.**

☐ **Hydrologic and hydraulic analysis:**

- (i) **Maps depicting locations of design points and drainage areas (size in acres) for runoff calculations**
- (ii) **Identification and calculations of stormwater site design credits, if applicable**
- (iii) **Time of concentration and associated flow paths**
- (iv) **Imperviousness of entire site and each drainage area**
- (v) **NRCS runoff curve numbers or volumetric runoff coefficients**
- (vi) **A hydrologic analysis for the existing (pre-development) conditions, including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations**
- (vii) **A hydrologic analysis for the proposed (post-development) conditions, including runoff rates, volumes, and velocities, showing the methodologies used and supporting calculations**
- (viii) **Hydrologic and hydraulic analysis of the stormwater management system for all applicable design storms**
- (ix) **Pollution load and load reductions requirements and calculations**
- (x) **Final good engineering and sizing calculations for stormwater control measures, including contributing drainage areas, storage, and outlet configurations, verifying compliance with the water quality and water quantity requirements of the regulations**
- (xi) **Stage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities**
- (xii) **Final analysis of the potential downstream impacts/effects of the project, as applicable**
- (xiii) **Downstream analysis, where detention is proposed**

☐ **Representative cross-section and profile drawings and details of stormwater control measures and conveyances that include:**

- (i) **Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.)**
- (ii) **Design water surface elevations**

- (iii) **Structural details of BMP designs, outlet structures, embankments, spillways, grade control structures, conveyance channels, etc.**
- ☐ **Applicable construction and materials specifications, including references to applicable material and construction standards (ASTM, etc.)**
- ☐ **Erosion and Sediment Control Plan that, at a minimum, meets the requirements outlined in the Virginia Erosion and Sediment Control Regulations and Handbook**
- ☐ **Landscaping plans for stormwater control measures (LID, etc.) and any site reforestation or revegetation**
- ☐ **Operations and maintenance plan/agreement that includes:**
 - (i) **Name, legal address and phone number of the party or parties responsible for long-term maintenance activities**
 - (ii) **Description and schedule of maintenance tasks**
 - (iii) **Identification/description of the source of funding to support maintenance activities**
 - (iv) **Description of access and safety issues**
 - (v) **Procedures for testing and disposal of sediments, if required**
 - (vi) **Right-of-entry authorization for local government inspections/repairs, as needed**
- ☐ **Evidence of acquisition of all applicable local and non-local permits**
- ☐ **Waiver/exception requests**
- ☐ **Evidence of acquisition of all necessary legal agreements (e.g., easements, covenants, land trusts, etc.)**
- ☐ **Applicable supporting documents and studies (e.g., infiltration tests, geotechnical investigations, TMDLs, flood studies, etc.)**
- ☐ **Other applicable permits**

APPENDIX 2 – EROSION & SEDIMENT CONTROL PLAN REVIEW CHECKLIST

JEFFERSON LAB EROSION & SEDIMENT CONTROL (E&SC) PLAN REVIEW CHECKLIST

A. Erosion and Sediment Control Plan (E&SC):

***An E&SC Plan consistent with the requirements of the Virginia Erosion & Sediment Control Law and regulations must be designed and implemented during construction activities. Prior to land-disturbance, this plan must be approved by the Jefferson Lab SWM and E&SC Program Authority in accordance with the Virginia Erosion & Sediment Control Law and regulations, along the approved Jefferson Lab Annual Standards and Specifications for Stormwater Management (SWM) and E&SC.**

B. E&SC Plan Checklist – Narrative:

***The E&SC Plan consists of two parts, the narrative and the site plan; the narrative verbally explains the problems and their solutions with all necessary documentation; the following checklist shall be submitted with the plan and shall serve as a quick reference to determine if all the major items are included in the E&SC Plan:**

☐ **Minimum Standards** – All Minimum Standards have been addressed

☐ **Project Description** – Describes the nature and purpose of the land-disturbing activity, and the area to be disturbed

☐ **Existing Site Conditions** – Describes existing topography, vegetation and drainage

☐ **Adjacent Areas** – Describes neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land-disturbance

☐ **Off-site Areas** – Describes any offsite land-disturbing activities that will occur (including borrow sites, waste or surplus areas, etc.)

☐ **Soils** – Describes the soils on the site which have potentially serious erosion problems (e.g., steep slopes, channels, wet weather/underground springs, etc.)

☐ **Critical Areas** – Describes the areas onsite which have potentially serious erosion problems (e.g., steep slopes, channels, wet weather/underground springs, etc.)

☐ **Erosion & Sediment Control Measures** – Describes the methods which will be used to control erosion & sedimentation on the site (controls shall meet the specifications in Chapter 3 of the VESCH)

☐ **Permanent Stabilization** – Describes, and provides specifications, of how the site will be stabilized after construction is completed

☐ **Stormwater Runoff Considerations** – Will the development site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describes the strategy to control stormwater runoff

☐ **Calculations** – Detailed calculations for the design of temporary sediment basins, permanent stormwater detention basins, diversions, channels, etc. (include calculations for both pre-development and post-development runoff)

C. E&SC Plan Checklist – Site Plan:

*The E&SC Plan consists of two parts, the narrative and the site plan; the site plan is a map(s) or drawing(s) that depicts information contained in the narrative; the following checklist shall be submitted with the plan and shall serve as a quick reference to determine if all the major items are included in the E&SC Plan:

☐ **Vicinity Map** – A small map locating the site in relation to the surrounding area is provided. Include any landmarks which might assist in locating the site

☐ **Indicate North** – The direction of north in relation to the site is depicted on the site plan

☐ **Limits of Clearing and Grading** – Areas that are to be cleared and graded are identified on the site plan

☐ **Existing Contours** – The existing contours of the site are depicted on the site plan

- ☐ **Final Contours** – Changes to the existing contours, including the final drainage patterns are included on the site plan
- ☐ **Existing Vegetation** – The existing tree lines, grassed areas, or unique vegetation are depicted on the site plan
- ☐ **Soils** – The boundaries of different soils types are depicted on the site plan
- ☐ **Existing Drainage Patterns** – The dividing lines and the direction of flow for the different drainage areas are depicted on the site plan. Includes the size of each drainage area
- ☐ **Critical Erosion Areas** – Areas with potentially serious erosion problems are depicted on the site plan
- ☐ **Site Development** – Shows all improvements such as buildings, parking lots, access roads, utility construction, etc.
- ☐ **Location of Practices** – The locations of E&SC's and SWM practices used on the site are depicted in the site plan
- ☐ **Offsite Areas** – Identifies any offsite land-disturbing activities (e.g., borrow sites, waste areas, etc.). Shows location of erosion controls
- ☐ **Detail Drawings** – Any structural practices used that are not referenced to the Virginia Erosion & Sediment Control Handbook (VESCH) are explained and illustrated with detail drawings
- ☐ **Maintenance** – A schedule of regular inspections and repair of E&SC structures have been implemented

APPENDIX 3 – STORMWATER MANAGEMENT/EROSION & SEDIMENT CONTROL INSPECTION REPORT FORM

JEFFERSON LAB SWPPP/E&SC INSPECTION REPORT

Project Name:		Project SOTR/PM:			
Inspector Name:		Inspection Date/Time:			
Weather Conditions:		Most Recent Precipitation Event:			
Site Specific BMPs/E&SCs:		SWPPP Site or E&SC Site:			
<div style="display: flex; justify-content: space-between;"> <div style="width: 33%;"> Pre-Construction Conference <input type="checkbox"/> Clearing & Grubbing <input type="checkbox"/> Rough Grading <input type="checkbox"/> </div> <div style="width: 33%;"> Building Construction <input type="checkbox"/> Finish Grading <input type="checkbox"/> Final Stabilization <input type="checkbox"/> </div> <div style="width: 33%;"> Construction of SWM Facilities <input type="checkbox"/> Maintenance of SWM Facilities <input type="checkbox"/> Other _____ <input type="checkbox"/> </div> </div>					
Item#	GENERAL INSPECTION INFORMATION	Yes	No	N/A	Comments/ Notes
1	Has a complete registration statement been submitted?				
2	Is a coverage letter and permit on-site?				
3	Is SWPPP signed and available on-site?				
4	Is an approved Erosion and Sediment Control Plan incorporated and is available on-site?				
5	Are contractors identified in SWPPP?				
6	Has detailed site map been updated to show current conditions?				
7	Does the SWPPP contain all required items?				
8	Are stabilization practices implemented and effective?				
9	Are dates of major grading activities recorded?				
10	Are structural practices in place and effective?				
11	Have sediment escapes been removed at a frequency sufficient to minimize off-site impacts?				
12	Have litter, debris, and chemicals been controlled from becoming a pollutant source?				
13	Have post-construction stormwater management practices been installed and effective?				
14	Is discharge from stormwater facilities or conveyance systems to an adequate channel?				
15	Are there significant impacts to receiving waters?				
16	Are public roads cleaned as required?				
17	Are controls being maintained?				
18	Are inspections conducted by "Qualified Personnel"?				
19	Are inspections conducted at required frequency?				
20	Do inspection reports summarize the scope of the inspections including corrective actions?				
21	Have monitoring well locations been identified?				
22	Are portable waste units >50' from stormdrains?				
23	Are corrective actions or other improvements documented in the project specific SWPPP?				

Item#	GENERAL INSPECTION INFORMATION (CONT.)	Yes	No	N/A	Comments/ Notes
24	Are stockpiles adequately stabilized with seeding and/or sediment trapping measures?				
25	Are on-site channels and outlets adequately stabilized?				
26	Are stormwater conveyance channels adequately stabilized with channel lining and/or outlet protection?				
27	Are utility trenches properly stabilized?				
28	Are soil, mud, and other sedimentation properly kept off of public roads?				
29	Have all temporary controls been removed that are no longer needed?				
30	Have any suspected discharges occurred since the last inspection?				
31	Are there any discharges occurring at the time of the inspection?				
Item#	SWPPP CONTENT	Yes	No	N/A	Comments/ Notes
	Description & function of project				
	Sequence & timing of land-disturbance activities				
	Estimate of total land-disturbance area including off-site areas				
	Location of support activities (equipment/vehicle washing, chemical storage areas, concrete washout areas, fueling/refueling areas, waste storage areas)				
	Identification of nearest receiving surface waters				
	Site map indicating				
	1. Direction of final storm flows & slopes 2. Areas of disturbed & undisturbed sites 3. Location of controls 4. Location of stabilization practices 5. Surface body water including wetlands 6. Location of stormwater discharges 7. Location of off-site areas 8. Location of potential pollution sources 9. Areas of final stabilization				
Item#	POLLUTANT REDUCTION CONTROLS	Yes	No	N/A	Comments/ Notes
	Description of pollution controls to be implemented & operator responsible for implementation of the control measures				
Item#	EROSION AND SEDIMENT CONTROLS	Yes	No	N/A	Comments/ Notes
	Stabilization practices				
	(a) Dates of major grading activities				

	Dates when grading temporarily or permanently cease Dates when stabilization measures are Initiated				
Item#	EROSION AND SEDIMENT CONTROLS (CONT.)	Yes	No	N/A	Comments/ Notes
	(b) Stabilization measures initiated within 7 days after construction has temporarily or permanently ceased {except as provided in §II D.2.a (1) (c), (d), & (e)}				
	Structural practices				
	(a) Sediment basin for disturbed areas of 3 acres or greater or equivalent control measures provide until final stabilization				
	(b) Where basins are not attainable, smaller sediment traps or at a minimum silt fence, vegetative buffer strips or equivalent sediment controls are installed for all down and side slope boundaries as appropriate				
	(c) Sediment traps are used for areas ≥ 3 acres or at a minimum silt fence, vegetative buffer strips or equivalent sediment controls are required for all down and side slope boundaries as appropriate				
	Management Practices				
	(1) Control measures properly selected, installed and maintained				
	(2) Off-site sediment accumulation removed to minimize off-site impacts				
	(3) Litter, construction debris, and chemicals prevented from becoming a pollutant source				
	Stormwater Management				
	(1) Calculations supporting all postconstruction stormwater management measures to be installed and measures designed and installed in accordance with applicable local and State requirements				
	(2) Technical explanation for practices selected to control pollutants and flows that exceed predevelopment levels				
	(3) Outflows from stormwater facility or conveyance system discharge to an adequate channel (no significant changes in the hydrologic regime of receiving water)				
	Other Controls				
	(1) Measures to prevent discharge of solid materials to surface waters				
	(2) Construction entrance (MS-17)				
	(3) Compliance with State or local waste disposal, sanitary sewer or septic system regulations				

	(4) Description of construction and waste materials, updates, controls to reduce storage, and storage practices				
	(5) Description of pollutant sources from areas other than construction (dedicated asphalt or concrete plants) and control measures to be used at those sites				
Item#	MAINTENANCE OF CONTROLS	Yes	No	N/A	Comments/ Notes
	Description and schedule of procedures to maintain all controls in effective operational condition				
	Existing BMPs modified or additional BMPs installed prior to next storm event. (If impractical to implement prior to storm event, documented in SWPPP)				
Item#	INSPECTIONS	Yes	No	N/A	Comments/ Notes
	Conducted by "Qualified Personnel"				
	Once every 14 days and within 48 hours After any runoff producing storm event				
	Inspection of discharge locations to ascertain whether ESC measures are effective in preventing significant impact to receiving waters				
	Linear projects inspected 0.25 miles above and below each access point				
	Based on results of inspections, the site, activity description, and pollution prevention measures are modified as appropriate within 7 calendar days following the inspection				
	Report summarizing scope of inspection				
	(1) Locations of pollutant discharges				
	(2) Locations of BMPs needing maintenance				
	(3) Locations of inadequate or failed BMPs				
	(4) Locations where BMPs are needed				
	(5) Corrective action required				
Item#	NONSTORMWATER DISCHARGE MAINTENANCE	Yes	No	N/A	Comments/ Notes
	<i>SWPPP identifies all allowable discharges</i>				
	(a) Fire fighting controls				
	(b) Fire hydrant flushing				
	(c) Vehicle washing (no detergent)				
	(d) Water used for dust control				
	(e) Potable water source				
	(f) Water for hydrostatic testing of pipelines				
	(g) Building washing (no detergent)				
	(h) Pavement washwaters (no hazardous materials or detergent used on pavement)				

	(i) Air conditioner or compressor condensation is uncontaminated				
	(j) Uncontaminated ground water or springs				
	(k) Foundation or footing drains				
Item#	NONSTORMWATER DISCHARGE MAINTENANCE (CONT.)	Yes	No	N/A	Comments/ Notes
	(l) Uncontaminated excavation dewatering				
	(m) Landscape irrigation				

EROSION AND SEDIMENT CONTROL PRACTICES					
STRUCTURAL CONTROLS	STANDARD/ SPECIFICATION	CORRECTIVE ACTION NEEDED			COMMENTS/OBSERVATIONS
		YES	NO	N/A	
Safety Fence	3.01				
Construction Entrance	3.02				
Construction Road Stabilization	3.03				
Straw Bale Barrier	3.04				
Silt Fence	3.05				
Brush Barrier	3.06				
Storm Drain Inlet Protection	3.07				
Culvert Inlet Protection	3.08				
Temporary Diversion Dike	3.09				
Temporary Fill Diversion	3.10				
Temporary Right-of-Way Diversion	3.11				
Diversion	3.12				
Temporary Sediment Trap	3.13				
Temporary Sediment Basin	3.14				
Temporary Slope Drain	3.15				
Paved Flume	3.16				

EROSION AND SEDIMENT CONTROL PRACTICES (CONT.)					
Stormwater Conveyance Channel	3.17				
Outlet Protection	3.18				
Riprap	3.19				
Rock Check Dams	3.20				
Level Spreader	3.21				
Vegetative Streambank Stabilization	3.22				
STRUCTURAL CONTROLS	STANDARD/ SPECIFICATION	CORRECTIVE ACTION NEEDED			Comments/ Observations
		YES	NO	N/A	
Structural Streambank Stabilization	3.23				
Temporary Vehicular Stream Crossing	3.24				
Utility Stream Crossing	3.25				
Dewatering Structure	3.26				
Turbidity Curtain	3.27				
Subsurface Drain	3.28				
Surface Roughening	3.29				
Topsoiling	3.30				
Temporary Seeding	3.31				
Permanent Seeding	3.32				
Sodding	3.33				
Bermudagrass & Zoysiagrass Establishment	3.34				
Mulching	3.35				
Soil Stabilization Blankets & Matting	3.36				
Trees, Shrubs, Vines & Ground Covers	3.37				
Tree Preservation & Protection	3.38				
Dust Control	3.39				

MINIMUM STANDARDS (9VAC25-840-40)					
Minimum Standard	Standard/ Specification	Yes	No	N/A	Comments/ Observations
MS-1	Stabilization of Denuded Areas				
MS-2	Stabilization of Stockpiles				
MS-3	Permanent Vegetative Cover				
MS-4	Timing and Stabilization of Sediment Trapping Measures				
MS-5	Stabilization of Earthen Structures				
MS-6	Sediment Basins and Sediment Traps				
MS-7	Cut and Fill Slope Design and Construction				
MS-8	Concentrated Runoff Down Cut and Fill Slopes				
MS-9	Slope Maintenance				
MS-10	Storm Sewer Inlet Protection				
MS-11	Outlet Protection				
MS-12	Work in Live Watercourses				
MS-13	Crossing a Live Watercourse				
MS-14	Regulations Applicable to Crossing Watercourses				
MS-15	Stabilization of Bed and Banks				
MS-16	Underground Utility Construction				
MS-17	Construction Access Routes and Sediment Tracking				
MS-18	Temporary Erosion and Sediment Control Removal				
MS-19	Stormwater Management of Volume, Velocity, and Peak Flow				
DEQ-CERTIFIED INSPECTOR					
	SIGNATURE				DATE

APPENDIX 4 – GENERAL EROSION & SEDIMENT CONTROL NOTES

TABLE 6-1

GENERAL EROSION AND SEDIMENT CONTROL NOTES

- ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations Erosion and Sediment Control Regulations.
- ES-2: The plan approving authority must be notified one week prior to the pre-construction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.
- ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.
- ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.
- ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.
- ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.
- ES-8: During dewatering operations, water will be pumped into an approved filtering device.
- ES-9: The contractor shall inspect all erosion control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

APPENDIX 5 – RUNOFF REDUCTION METHOD SPREADSHEETS

Drainage Area A Land Cover (acres)

	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
	Total				0.00

Apply Runoff Reduction Practices to Reduce Treatment Volume & Post-Development Load in Drainage Area A

Credit	Unit	Description of Credit	Credit	Credit Area (acres)	Volume from Upstream RR Practice (cf)	Runoff Reduction (cf)	Remainin g Runoff Volume (cf)	Phosphor us Efficiency (%)	Phosphor us Load from Upstream RR Practices (lbs)	Untreated Phosphor us Load to Practice (lbs.)	Phosphor us Removed By Practice (lbs.)	Remainin g Phosphor us Load (lbs.)	Downstrea m Treatment to be Employed
1. Vegetated Roof													
1.a. Vegetated Roof #1 (Spec #5)	acres of green roof	45% runoff volume reduction	0.45	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
1.b. Vegetated Roof #2 (Spec #5)	acres of green roof	60% runoff volume reduction	0.60	0.00	0	0	0	0	0.00	0.00	0.00	0.00	

2. Rooftop Disconnection													
2.a. Simple Disconnection to A/B Soils (Spec #1)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.b. Simple Disconnection to C/D Soils (Spec #1)	impervious acres disconnected	25% runoff volume reduction for treated area	0.25	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.c. To Soil Amended Filter Path as per specifications (existing C/D soils) (Spec #4)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.d. To Dry Well or French Drain #1 (Microinfiltration #1) (Spec #8)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.e. To Dry Well or French Drain #2 (Micro-Infiltration #2) (Spec #8)	impervious acres disconnected	90% runoff volume reduction for treated area	0.90	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.f. To Rain Garden #1 (Micro-Bioretenention #1) (Spec #9)	impervious acres disconnected	40% of volume captured	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.g. To Rain Garden #2 (Micro-Bioretenention #2) (Spec #9)	impervious acres disconnected	80% runoff volume reduction for treated area	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	
2.h. To Rainwater Harvesting (Spec #6)	impervious acres captured	based on tank size and design spreadsheet (See Spec #6)	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.i. To Stormwater Planter (Urban Bioretenention) (Spec #9, Appendix A)	impervious acres disconnected	40% runoff volume reduction for treated area	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	

3. Permeable Pavement													
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Nitrogen Efficiency (%)	Nitroge n Load from Upstrea m Practice s (lbs)	Untreat ed Nitroge n Load to Practice (lbs.)	Nitrogen Removed By Practice (lbs.)	Remaini ng Nitrogen Load (lbs.)
1. Green Roof				
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00

2. Impervious Surface Disconnection				
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00

3. Permeable Pavement				
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3.a. Permeable Pavement #1 (Spec #7)	acres of permeable pavement + acres of "external" (upgradient) impervious pavement	45% runoff volume reduction	0.45	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
3.b. Permeable Pavement #2 (Spec #7)	acres of permeable pavement	75% runoff volume reduction	0.75	0.00	0	0	0	25	0.00	0.00	0.00	0.00	

25	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00

4. Grass Channel													
4.a. Grass Channel A/B Soils (Spec #3)	impervious acres draining to grass channels	20% runoff volume reduction	0.20	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	20% runoff volume reduction	0.20	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
4.b. Grass Channel C/D Soils (Spec #3)	impervious acres draining to grass channels	10% runoff volume reduction	0.10	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	10% runoff volume reduction	0.10	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
4.c. Grass Channel with Compost Amended Soils as per specs (see Spec #4)	impervious acres draining to grass channels	30% runoff volume reduction	0.30	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	30% runoff volume reduction	0.30	0.00	0	0	0	15	0.00	0.00	0.00	0.00	

20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00

5. Dry Swale													
5.a. Dry Swale #1 (Spec #10)	impervious acres draining to dry swale	40% runoff volume reduction	0.40	0.00	0	0	0	20	0.00	0.00	0.00	0.00	
	turf acres draining to dry swale	40% runoff volume reduction	0.40	0.00	0	0	0	20	0.00	0.00	0.00	0.00	
5.b. Dry Swale #2 (Spec #10)	impervious acres draining to dry swale	60% runoff volume reduction	0.60	0.00	0	0	0	40	0.00	0.00	0.00	0.00	
	turf acres draining to dry swale	60% runoff volume reduction	0.60	0.00	0	0	0	40	0.00	0.00	0.00	0.00	

25	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00

6. Bioretention													
6.a. Bioretention #1 or Urban Bioretention (Spec #9)	impervious acres draining to bioretention	40% runoff volume reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
	turf acres draining to bioretention	40% runoff volume reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
6.b. Bioretention #2 (Spec #9)	impervious acres draining to bioretention	80% runoff volume reduction	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	
	turf acres draining to bioretention	80% runoff volume reduction	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	

40	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00

7. Infiltration													
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7. Infiltration				
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7.a. Infiltration #1 (Spec #8)	impervious acres draining to infiltration	50% runoff volume reduction	0.50	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
	turf acres draining to infiltration	50% runoff volume reduction	0.50	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
7.b. Infiltration #2 (Spec #8)	impervious acres draining to infiltration	90% runoff volume reduction	0.90	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
	turf acres draining to infiltration	90% runoff volume reduction	0.90	0.00	0	0	0	25	0.00	0.00	0.00	0.00	

8. Extended Detention Pond

8.a. ED #1 (Spec #15)	impervious acres draining to ED	0% runoff volume reduction	0.00	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to ED	0% runoff volume reduction	0.00	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
8.b. ED #2 (Spec #15)	impervious acres draining to ED	15% runoff volume reduction	0.15	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to ED	15% runoff volume reduction	0.15	0.00	0	0	0	15	0.00	0.00	0.00	0.00	

9. Sheetflow to Filter/Open Space

9.a. Sheetflow to Conservation Area with A/B Soils (Spec #2)	impervious acres draining to conserved open space	75% runoff volume reduction for treated area	0.75	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
	turf acres draining to conserved open space	75% runoff volume reduction for treated area	0.75	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
9.b. Sheetflow to Conservation Area with C/D Soils (Spec #2)	impervious acres draining to conserved open space	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
	turf acres draining to conserved open space	50% runoff reduction volume for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
9.c. Sheetflow to Vegetated Filter Strip in A Soils or Compost Amended B/C/D Soils (Spec #2 & #4)	impervious acres draining to conserved open space	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
	turf acres draining to conserved open space	50% runoff reduction volume for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	

15	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00

8. Extended Detention Pond

10	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00

9. Sheetflow to Conservation Area or Filter Strip

0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00

TOTAL PHOSPHOROUS REMOVAL REQUIRED ON SITE (lb/yr)	#DIV/0!
TOTAL RUNOFF REDUCTION IN D.A. A (cf)	0
PHOSPHORUS REMOVAL FROM RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE CALCULATIONS

TOTAL RUNOFF REDUCTION IN D.A. A (cf)	0
NITROGEN REMOVAL FROM RUNOFF REDUCTION PRACTICES IN D.A. A (lb/yr)	0.00

Apply Practices that Remove Pollutants but Do Not Reduce Runoff Volume

Practice	Unit	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	Phosphorus Load from Upstream RR Practices (lbs)	Untreated Phosphorus Load to Practice (lbs.)	Phosphorus Removed By Practice (lbs.)	Remaining Phosphorus Load (lbs.)	Downstream Treatment to be Employed
10. Wet Swale (Coastal Plain)									
10.a. Wet Swale #1 (Spec #11)	impervious acres draining to wet swale	0.00	20	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet swale	0.00	20	0.00	0.00	0.00	0.00	0.00	
10.b. Wet Swale #2 (Spec #11)	impervious acres draining to wet swale	0.00	40	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet swale	0.00	40	0.00	0.00	0.00	0.00	0.00	

Nitrogen Efficiency (%)	Nitrogen Load from Upstream RR Practices (lbs)	Untreated Nitrogen Load to Practice (lbs.)	Nitrogen Removed By Practice (lbs.)	Remaining Nitrogen Load (lbs.)
10. Wet Swale (Coastal Plain)				
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00

11. Filtering Practices									
11.a.Filtering Practice #1 (Spec #12)	impervious acres draining to filter	0.00	60	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to filter	0.00	60	0.00	0.00	0.00	0.00	0.00	
11.b. Filtering Practice #2 (Spec #12)	impervious acres draining to filter	0.00	65	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to filter	0.00	65	0.00	0.00	0.00	0.00	0.00	

11. Filtering Practices				
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00

12. Constructed Wetland									
12.a.Constructed Wetland #1 (Spec #13)	impervious acres draining to wetland	0.00	50	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wetland	0.00	50	0.00	0.00	0.00	0.00	0.00	
12.b. Constructed Wetland #2 (Spec #13)	impervious acres draining to wetland	0.00	75	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wetland	0.00	75	0.00	0.00	0.00	0.00	0.00	

12. Constructed Wetland				
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00

13. Wet Ponds									
13.a. Wet Pond #1 (Spec #14)	impervious acres draining to wet pond	0.00	50	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet pond	0.00	50	0.00	0.00	0.00	0.00	0.00	

13. Wet Ponds				
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00

13.b. Wet Pond #1 (Coastal Plain) (Spec #14)	impervious acres draining to wet pond	0.00	45	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet pond	0.00	45	0.00	0.00	0.00	0.00	0.00	
13.c. Wet Pond #2 (Spec #14)	impervious acres draining to wet pond	0.00	75	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet pond	0.00	75	0.00	0.00	0.00	0.00	0.00	
13.d. Wet Pond #2 (Coastal Plain) (Spec #14)	impervious acres draining to wet pond	0.00	65	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to wet pond	0.00	65	0.00	0.00	0.00	0.00	0.00	
14. Manufactured BMP									
14. Insert Name of Device	impervious acres draining to device	0.00	0	0.00	0.00	0.00	0.00	0.00	
	turf acres draining to device	0.00	0	0.00	0.00	0.00	0.00	0.00	

PHOSPHORUS REMOVAL BY PRACTICES THAT DO NOT REDUCE RUNOFF VOLUME IN D.A. A	0.00
TOTAL PHOSPHORUS REMOVAL IN D.A. A (lb/yr)	0.00

SEE WATER QUALITY COMPLIANCE TAB FOR SITE COMPLIANCE
CALCULATIONS

NITROGEN REMOVAL BY PRACTICES THAT DO NOT REDUCE RUNOFF VOLUME IN D.A. A	0.00
TOTAL NITROGEN REMOVAL IN D.A. A (lb/yr)	0.00

20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00
14. Manufactured BMP				
0	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00

Site Results

Phosphorous

TOTAL TREATMENT VOLUME (cf)	#DIV/0!
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	#DIV/0!
RUNOFF REDUCTION (cf)	0
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	0.00
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	#DIV/0!
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	#DIV/0!

Nitrogen (for information purposes)

TOTAL TREATMENT VOLUME (cf)	#DIV/0!
RUNOFF REDUCTION (cf)	0
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)	0.00
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	#DIV/0!

	1-year storm	2-year storm	10-year storm
Target Rainfall Event (in)	2.70	3.35	5.15

Drainage Area A	
Drainage Area (acres)	0.00
Runoff Reduction Volume (cf)	0

Drainage Area B	
Drainage Area (acres)	0.00
Runoff Reduction Volume (cf)	0

Drainage Area C	
Drainage Area (acres)	0.00
Runoff Reduction Volume (cf)	0

Drainage Area D	
Drainage Area (acres)	0.00
Runoff Reduction Volume (cf)	0

Drainage Area E	
Drainage Area (acres)	0.00
Runoff Reduction Volume (cf)	0

Based on the use of Runoff Reduction practices in the various drainage areas, the spreadsheet calculates an adjusted Vdeveloped and adjusted Curve Number.

Drainage Area A		A soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.0	0.0	0.0	0.0
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.0	0.0	0.0	0.0
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.0	0.0	0.0	0.0
	CN	98	98	98	98
		Weighted CN		S	
		0		1000.00	
		1-year storm	2-year storm	10-year storm	
RV _{Developed} (in) with no Runoff Reduction		0.00	0.00	0.00	
RV _{Developed} (in) with Runoff Reduction		0.00	0.00	0.00	
Adjusted CN		43	#N/A	#N/A	
Drainage Area B		A soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	Area (acres)	0.0	0.0	0.0	0.0
	CN	30	55	70	77
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	Area (acres)	0.0	0.0	0.0	0.0
	CN	39	61	74	80
Impervious Cover	Area (acres)	0.0	0.0	0.0	0.0
	CN	98	98	98	98

Weighted CN	S
0	1000.00

	1-year storm	2-year storm	10-year storm
RV _{Developed} (in) with no Runoff Reduction	0.00	0.00	0.00
RV _{Developed} (in) with Runoff Reduction	0.00	0.00	0.00
Adjusted CN	43	#N/A	#N/A

	A soils	B Soils	C Soils	D Soils
Area (acres)	0.0	0.0	0.0	0.0
CN	30	55	70	77
Area (acres)	0.0	0.0	0.0	0.0
CN	39	61	74	80
Area (acres)	0.0	0.0	0.0	0.0
CN	98	98	98	98

Weighted CN	S
0	1000.00

	1-year storm	2-year storm	10-year storm
RV _{Developed (in) with no Runoff Reduction}	0.00	0.00	0.00
RV _{Developed (in) with Runoff Reduction}	0.00	0.00	0.00
Adjusted CN	43	#N/A	#N/A

	A soils	B Soils	C Soils	D Soils
Area (acres)	0.0	0.0	0.0	0.0
CN	30	55	70	77
Area (acres)	0.0	0.0	0.0	0.0
CN	39	61	74	80
Area (acres)	0.0	0.0	0.0	0.0
CN	98	98	98	98

Weighted CN	S
0	1000.00

	1-year storm	2-year storm	10-year storm
RV_{Developed (in)} with no Runoff Reduction	0.00	0.00	0.00
RV_{Developed (in)} with Runoff Reduction	0.00	0.00	0.00
Adjusted CN	43	#N/A	#N/A

	A soils	B Soils	C Soils	D Soils
Area (acres)	0.0	0.0	0.0	0.0
CN	30	55	70	77
Area (acres)	0.0	0.0	0.0	0.0
CN	39	61	74	80
Area (acres)	0.0	0.0	0.0	0.0
CN	98	98	98	98

Weighted CN	S
0	1000.00

	1-year storm	2-year storm	10-year storm
RV _{Developed} (in) with no Runoff Reduction	0.00	0.00	0.00

RV _{Developed} (in) with Runoff Reduction	0.00	0.00	0.00
Adjusted CN	43	#N/A	#N/A

Using the Adjusted Curve Number for each drainage area, calculate peak discharges for the 1, 2, and 10 year storm. Compare the peak discharges to the allowable discharge rates described in the Virginia Stormwater Management Program Permit Regulations (4VAC 50-60-66(B), conditions 1-5 and 4VAC 50-60-66(C), conditions 1-5).

APPENDIX 6 – E&SC TECHNICAL BULLETIN NO. 4: NUTRIENT MANAGEMENT FOR DEVELOPMENT SITE

Erosion & Sediment Control Technical Bulletin No. 4
Nutrient Management for Development Sites

PRINCIPLE

This Erosion & Sediment Control Technical Bulletin updates the vegetative cover standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass of the 1992 *Virginia Erosion and Sediment Control Handbook*, in accordance with the 1995 *Virginia Nutrient Management Standards and Criteria*. Specifically, the vegetation standards and specifications have been updated to reflect that no more than one (1) pound of water soluble nitrogen per 1,000 square feet is to be applied on construction sites in a 30 day period. Attached are one-page updates to the vegetative cover standards and specifications, which provide updated fertilizer and lime rates and the seeding schedules for the different physiographic regions of Virginia.

This document also discusses the need to ensure healthy vegetative growth by promoting a fertile soil as a crucial step in the establishment of vegetation, which can reduce the amount of nutrients (fertilizers) required to maintain a good vegetative cover.

THE IMPORTANCE OF URBAN NUTRIENT MANAGEMENT

Nutrients in urban runoff have been identified as being a significant contributor to the decline of the Chesapeake Bay, as well as Virginia's rivers, lakes, streams and groundwater. Improper timing or over application of plant nutrients is a major cause of non-point source pollution that can result in the impairment of Virginia's groundwater and surface waters. Runoff that carries nitrogen or phosphorus can lead to the increased growth of algae and aquatic weeds, de-oxygenation, and reduced water clarity, which degrades water quality and stresses underwater plant and animal life.

Typical land development practices degrade soil quality and make it difficult to establish lawns and landscaped areas. In the course of development, soil rich in organic material is often stripped, compacted, buried under subsoil, or removed and replaced with shallower depths of lower quality, imported soil or fill material. Properly establishing an appropriate and uniform vegetative cover as quickly as possible on denuded sites plays an extremely important role in reducing erosion and minimizing sedimentation to downstream waterways.

Nutrient management on construction sites helps prevent the pollution and degradation of state waters. Not only are there economic benefits of applying less fertilizer, nutrient reduction can be achieved by applying fertilizer more efficiently. In short, nutrient management is an environmentally and economically sound practice for restoring waters in Virginia and involves the implementation of practices that promote vegetative cover in developing areas while protecting water quality.

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ESTABLISHMENT OF VEGETATIVE COVER

Developing a fertile soil is a crucial step in the establishment of vegetation, which can reduce the amount of fertilizer required to maintain good vegetative cover. A fertile soil has the capacity to supply the nutritional needs of the plants being established. Good soil quality characteristics include good soil texture, adequate nutrients available for plant growth, good moisture holding capacity, and the appropriate soil acidity/alkalinity balance (pH). The following is a discussion of the steps needed to ensure good vegetative growth.

1. Soil Tests

Soil tests are extremely important and should be conducted on every site. Soil tests provide specific information on the amounts of phosphorus, potassium, calcium and magnesium available for plant uptake and recommends additional amounts as required. Soil tests are crucial for determining the amount of lime needed to obtain an appropriate soil pH for the vegetation being established. Soil test results include recommendations specific to the site and vegetation being grown. Soil tests recommend the amount of plant nutrients and lime needed to promote and maintain good plant growth. Soil tests may be performed by the Cooperative Extension Service Soil Testing Laboratory at VPI & SU, or by a reputable commercial laboratory. Also note that County Extension offices have soil testing supplies and information.

Soil tests are not used to determine nitrogen needs. Nitrogen is applied based upon established requirements for the plant to be grown, season of growth, and intended use.

2. Surface Roughening

Provide a rough soil surface by stair-step grading, grooving, or tracking the soil to be vegetated or by leaving slopes in a roughened condition by not fine-grading, in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.29). Seed germination is difficult with compacted soils. Rough, loose soil surfaces helps prevent the loss of lime and fertilizer due to runoff, increases water infiltration, and provides seed coverage, which aids in seed germination.

3. Soil Amendments & Soil Quality

Materials such as sand, vermiculite, peat, and compost may be added to soil to modify texture, improve structure and increase the moisture holding capacity. It is also recommended to conserve existing soil quality by preserving and reapplying topsoil in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.30). Areas that have been compacted, or where duff or underlying topsoil is removed, should be amended with compost to improve soil quality.

4. Lime

Adjusting the soil pH between 6.25 to 6.5 is extremely important for grass establishment, especially in the acidic soils of Virginia. A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of denuded sites. However, when a soil test has not been performed, apply 2-tons/acre (90 pounds per 1,000 square feet) of pulverized agricultural grade limestone.

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5. Fertilizer

Never apply more than 1 pound of water soluble nitrogen per 1,000 square feet within a 30 day period. Nitrogen should be applied based upon established requirements of the plant to be grown, season of growth, and intended use. Establishing a uniform dense vegetative cover with a good root system reduces the potential for pollution by decreasing erosion and runoff, increasing the plants ability for nutrient uptake, and reducing pesticide use. A detailed discussion on fertilizer use is provided in the 'Updated Fertilizer Specifications and Rates for Establishment' section of this bulletin.

6. Incorporation

Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by discing or by other means. Incorporation reduces the potential nutrient loss due to runoff, as well as significantly increasing the success of establishing a vegetative cover. When surface roughening does not occur prior to the application of lime and fertilizer, 'mix' the lime and fertilizer into the soil, at least 4 inches, by the methods described in the *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.29).

When incorporation does not occur, and fertilizer and lime is applied directly to a smooth surface, the phosphorus (P_2O_5) application rate must be reduced by half because of the limited contact area with soil and the risk of nutrients being lost in runoff.

7. Seeding

Selection of plants is based on climate, topography, soils, land use and the planting season. The *1992 Virginia Erosion and Sediment Control Handbook* vegetative cover standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass, describe in detail the specifications for plant selection. In addition, attached are one-page updates to the vegetative cover standards and specifications, which provide updated fertilizer and lime rates and the seeding schedules for the different physiographic regions of Virginia.

8. Mulching

The application of mulch to the soil surface, for both temporary and permanent seeding, is one of the most effective means of controlling runoff and erosion on disturbed land. All permanent seeding must be mulched immediately upon completion of seed application. It is especially important to mulch liberally in mid-summer and prior to winter. Mulching prevents erosion, and thereby pollution, by protecting the soil surface and fostering the growth of vegetation by increasing the moisture content and providing insulation from extreme temperatures. The *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.35) details the mulch specifications and includes a list of the typical materials used to mulch (for example straw, wood chips, and fiber mulch).

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9. Hydroseeding

Hydroseeding is a mechanical method of applying seed, fertilizer, and mulch to land development sites in one step. This method is efficient in providing an immediate cover to denuded sites; however, the surface must be carefully prepared in order for successful seed germination. Hydroseed on rough, loose surfaces only. Roughen the surface prior to application of hydroseeding, per the specification above and in accordance with the *1992 Virginia Erosion & Sediment Control Handbook* (Std & Spec 3.29). Although proper soil pH is crucial in establishing good vegetative cover, lime is usually not included in the hydroseed mix. Therefore, lime should be incorporated into the soil as needed when preparing the site for hydroseeding.

To avoid poor seed germination as a result of seed damage during hydroseeding, it is recommended that if the machinery breaks down from 30 minutes to 2 hours, 50% more seed must be added to the tank. Beyond 2 hours, a full rate of new seed is usually necessary.

UPDATED FERTILIZER SPECIFICATIONS AND RATES FOR ESTABLISHMENT

Plant nutrients should be applied based upon established requirements of the plant to be grown, season of growth, and intended use, as specified in the *1992 Virginia Erosion and Sediment Control Handbook* (Std & Spec 3.31, 3.32, 3.33, and 3.34). The timing and rate of fertilizer application depends on the type of grass. There are basically two types of grasses, warm and cool season grasses. Warm season grasses (Bermuda, Zoysia) are those that go dormant in the winter. Cool season grasses (Fescue, Bluegrass) are those that stay green year round.

1. Recommended Season for Applying Nitrogen Fertilizers

The earliest spring application of nitrogen for cool season grasses is six weeks prior to the last average frost date (for example, February 6 for Virginia Beach and March 1 for Roanoke). The latest fall application of nitrogen for cool season grasses is six weeks after the first average frost date (for example, December 29 for Virginia Beach and December 1 for Roanoke).

The earliest spring application of nitrogen for warm season grasses is the last average frost date for the region (for example, March 20 for Virginia Beach and April 15 for Roanoke). The latest fall application of nitrogen for warm season grasses is 30 days prior to the average first frost date for the region (for example, October 15 for Virginia Beach and September 20 for Roanoke).

2. Per Application Rates

Phosphorus (P) and potassium (K) fertilizer requirements should be determined by a soil test. Never apply more than one (1) pound of water soluble nitrogen per 1,000 square feet within a 30 day period. The following table itemizes the fertilization rate revisions to standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermudagrass & Zoysiagrass Establishment.

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Summary of Fertilizer Specification Revisions for Establishment of Turf

Standards & Specifications		2003 Urban Nutrient Management Technical Bulletin
3.31 Temporary Seeding		10-10-10 fertilizer applied at a rate of 450 lbs. / acre or 10 lbs. / 1,000 ft ²
3.32 Permanent Seeding	Mixed Grasses & Legumes	10-20-10 fertilizer applied at a rate of 500 lbs. / acre or 12 lbs. / 1,000 ft ²
	Legume stands only	Apply the equivalent of 100 lbs. of phosphate (P ₂ O ₅) and 100 lbs. of Potash (K ₂ O) per acre. NO NITROGEN (N)
	Grass stands only	10-20-10 fertilizer applied at a rate of 500 lbs. / acre or 12 lbs. / 1,000 ft ²
3.33 Sodding		10-10-10 fertilizer applied at a rate of 450 lbs. / acre or 10 lbs. / 1,000 ft ² . NOTE: For cool season grasses apply fertilizer in fall or spring. For warm season grasses apply the fertilizer in late spring or summer only.
3.34 Bermudagrass & Zoysiagrass Establishment		10-10-10 fertilizer applied at a rate of 500 lbs. / acre or 12 lbs. / 1,000 ft ² . Apply additional phosphorus and potassium 30-60 days later based on the soil test. Apply an additional equivalent of 1 lb./1,000 ft ² of nitrogen when the P & K are applied.

3. Using Fertilizer Analysis to Calculate Nitrogen Rates

All fertilizer packages have three numbers present on the package (for example, 10-10-10 or 16-4-8). These three numbers indicate the percentage of nitrogen (N), phosphorus (P₂O₅), and potash (K₂O) present by weight which is called the N-P-K ratio. For example, a 20 pound bag of 10-6-4 is 10 percent nitrogen (2 lb. of N), 6 percent phosphate (1.2 lb. of P₂O₅), and 4 percent potash (0.8 lb. of K₂O) the remaining is inert material to facilitate even application of fertilizer.

The Virginia nutrient management recommendation is to apply no more than 1 lb. of nitrogen per 1,000 square feet within a 30 day period. A fertilization rate of 1 lb. of nitrogen per 1,000 square feet can be obtained for any site by using the fertilizer analyses on the bag and knowing the area of application.

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Fertilizer Bag Reads:	Amount to Fertilizer to Apply 1 lb. of nitrogen / 1000 sq.ft.
6-2-0	16.6 lb.
10-10-10	10 lb.
16-4-8	6.2 lb.
20-5-5	5 lb.
22-3-14	4.5 lb.
29-3-7	3.4 lb.

4. Use of Slowly Available Forms of Nitrogen

Fertilizer bags will state the source or category from which the nitrogen is derived. Nitrogen fertilizers have two categories: Water Soluble Nitrogen (i.e., all nitrogen is immediately available); and Slowly Available Nitrogen (i.e., nitrogen is available over an extended period of time). The nitrogen source impacts how grass is fertilized and the rate and timing of application of fertilizer.

Choose a fertilizer that has some amount of Slowly Available Nitrogen (SAN). Slowly available nitrogen fertilizers make nitrogen available a little at a time, the way most grasses need it, which reduces both the potential of excess nutrients in runoff and the leaching potential of excess nutrients into groundwater. Sources of SAN are usually stated on the label. It may be stated as % Water Insoluble Nitrogen (WIN), sulfur-coated urea, natural organic nitrogen or other controlled release materials used to coat the fertilizer. The % WIN is usually stated on the fertilizer container, if the % WIN is not listed, assume that all the nitrogen in the fertilizer is water soluble and immediately available. As a general guideline, if the fertilizer has 50% WIN or less, it should be applied in the same manner as readily available nitrogen. If the fertilizer is 50% WIN or greater, it should be applied as a SAN.

UPDATED FERTILIZER SPECIFICATIONS AND RATES FOR MANAGEMENT

1. Application of Fertilizer for Maintenance

Apply fertilizer when grass is actively growing and can utilize the nutrients. Summer is best for warm season grasses (zoysiagrass and bermudagrass) while the fall months are best for cool season grasses (tall fescue, Kentucky bluegrass, perennial ryegrass).

2. Annual Application Rates

- A. When applying 100% Water Soluble Nitrogen sources (those that have all the nitrogen immediately available for plant use), the following rates apply:
 - Never apply more than one (1) pound of water soluble nitrogen per 1,000 square feet within a 30 day period
 - No more than 3.5 lbs. of nitrogen per 1,000 square feet annually on cool season grass.
 - No more than 4.0 lbs. of nitrogen per 1,000 square feet annually on warm season grass.

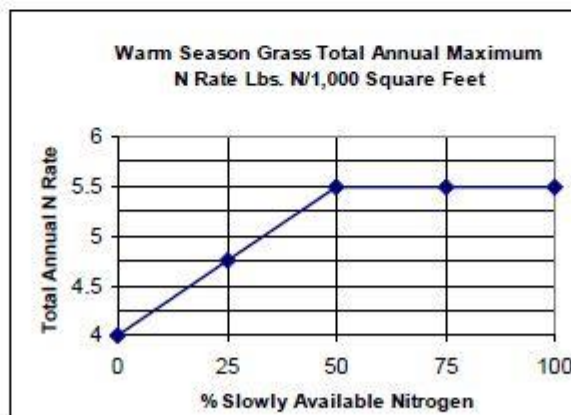
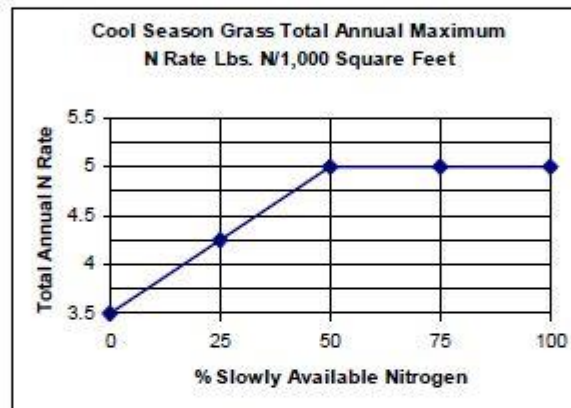
Revised 7/17/03

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B. When applying slowly available nitrogen (SAN, WIN, sulfur-coated urea, natural organic nitrogen or other controlled release materials), total annual nitrogen application rates may be adjusted incrementally by referring to the following figure. The maximum annual nitrogen rates when using 50% or greater SAN is as follows:

- No more than 5.0 lbs. of nitrogen per 1,000 square feet annually on cool season grass.
- No more than 5.5 lbs. of nitrogen per 1,000 square feet annually on warm season grass.



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C. When applying maintenance fertilizer on established sod,

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is less than 50 percent WIN				
Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
September	1	1	0	0
October	1	1	0	0
Early November	0	0	0	0
April	0	0	0	0
May	0-0.5	0-0.05	1	1
June	0	0	1	0
July/August	0	0	0	1
Yearly Lbs. N/1000 sf	2.5	2.5	2	2
Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is more than 50 percent WIN				
Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
August 15	1.5	1.5	0	0
October 1	1.5	1.5	0	0
April	0	0	1.5	1.5
May 15	0	0	0	0
June	0	0	1.5	1.5
Yearly Lbs. N/1000 sf	3	3	3	3

TABLE 3.31-B
 (Revised June 2003)
TEMPORARY SEEDING SPECIFICATIONS
QUICK REFERENCE FOR ALL REGIONS

<u>SEED</u>		
APPLICATION DATES	SPECIES	APPLICATION RATES
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass (<i>Lolium multi-florum</i>) & Cereal (Winter) Rye (<i>Secale cereale</i>)	50 - 100 (lbs/acre)
Feb. 16 - Apr. 30	Annual Ryegrass (<i>Lolium multi-florum</i>)	60 - 100 (lbs/acre)
May 1 - Aug. 31	German Millet	50 (lbs/acre)

<u>FERTILIZER & LIME</u>
<ul style="list-style-type: none"> ● Apply 10-10-10 fertilizer at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.) ● Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.) <p>NOTE:</p> <p>1 - A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.</p> <p>2 - Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.</p> <p>3 - When applying Slowly Available Nitrogen, use rates available in <u>Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites</u> at http://www.dcr.state.va.us/sw/e&s.htm#pubs</p>

TABLE 3.32-C
 (Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR APPALACHIAN/MOUNTAIN AREA

SEED¹		
LAND USE	SPECIES	APPLICATION RATES
<u>Minimum Care Lawn</u> (Commercial or Residential)	Tall Fescue ¹	90-100%
	Perennial Ryegrass ²	0-10%
	Kentucky Bluegrass ¹	0-10%
	TOTAL: 200-250 lbs.	
<u>High-Maintenance Lawn</u>	Minimum of three (3) up to five (5) varieties of Kentucky Bluegrass from approved list for use in Virginia ¹	TOTAL: 125 lbs.
<u>General Slope (3:1 or less)</u>	Tall Fescue ¹	128 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ³	20 lbs.
	TOTAL: 150 lbs.	
<u>Low-Maintenance Slope</u> (Steeper than 3:1)	Tall Fescue ¹	108 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ³	20 lbs.
	TOTAL: 150 lbs.	

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at <http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html>

2 - Perennial Ryegrass will germinate faster and at lower soil temperatures than Tall Fescues, thereby providing cover and erosion resistance for seedbed.

3 - Use seasonal nurse crop in accordance with seeding dates as stated below:

March, April - May 15 th	Annual Rye
May 16 th - August 15 th	Foxtail Millet
August 16 th - September, October	Annual Rye
November - February	Winter Rye

4 - All legume seed must be properly inoculated. If Flatpea is used, increase to 30 lbs/acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/sw/e&s.htm#pubs>

TABLE 3.32-D
 (Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR PIEDMONT AREA

SEED¹		
LAND USE	SPECIES	APPLICATION PER ACRE
<u>Minimum Care Lawn</u> (Commercial or Residential)	Tall Fescue ¹	95-100%
	Perennial Ryegrass	0-5%
	Kentucky Bluegrass ¹	0-5%
	TOTAL: 175-200 lbs.	
<u>High-Maintenance Lawn</u>	Tall Fescue ¹	TOTAL: 200-250 lbs.
<u>General Slope (3:1 or less)</u>	Tall Fescue ¹	128 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ²	20 lbs.
	TOTAL: 150 lbs.	
<u>Low-Maintenance Slope</u> (Steeper than 3:1)	Tall Fescue ¹	108 lbs.
	Red Top Grass or Creeping Red Fescue	2 lbs.
	Seasonal Nurse Crop ²	20 lbs.
	Crownvetch ³	20 lbs.
	TOTAL: 150 lbs.	

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at <http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html>

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

February 16 th - April	Annual Rye
May 1 st - August 15 th	Foxtail Millet
August 16 th - October	Annual Rye
November - February 15 th	Winter Rye

3 - Substitute Sericea lespedeza for Crownvetch east of Farmville, VA (May through September use hulled seed, all other periods, use unhulled Sericea). If Flatpea is used, increase rate to 30 lbs./acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40

FERTILIZER & LIME

- Apply 10-20-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/sw/e&s.htm#pubs>

TABLE 3.32-E
 (Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR COASTAL PLAIN AREA

<u>SEED¹</u>		
LAND USE	SPECIES	APPLICATION RATES
<u>Minimum Care Lawn</u> (Commercial or Residential)	Tall Fescue ¹	175 - 200 lbs.
	or Bermudagrass ¹	75 lbs.
<u>High-Maintenance Lawn</u>	Tall Fescue ¹	200-250 lbs.
	or Bermudagrass ¹ (seed) or Bermudagrass ¹ (by other vegetative establishment method, see Std. & Spec. 3.34)	40 lbs. (unhulled) 30 lbs. (hulled)
<u>General Slope (3:1 or less)</u>	Tall Fescue ¹	128 lbs.
	Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop ²	2 lbs. 20 lbs. TOTAL: 150 lbs.
<u>Low-Maintenance Slope</u> (Steeper than 3:1)	Tall Fescue ¹	93-108 lbs.
	Bermudagrass ¹ Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop ² Sericea Lespedeza ³	0-15 lbs. 2 lbs. 20 lbs. 20 lbs. TOTAL: 150 lbs.

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at <http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html>

2 - Use seasonal nurse crop in accordance with seeding dates as stated below:

February, March - April	Annual Rye
May 1 st - August	Foxtail Millet
September, October - November 15 th	Annual Rye
November 16 th - January	Winter Rye

3 - May through October, use hulled seed. All other seeding periods, use unhulled seed. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 fertilizer at a rate of 500 lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply Pulverized Agricultural Limestone at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:

- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at <http://www.dcr.state.va.us/sw/e&s.htm#pubs>